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OUR BEST OPPORTUNITY

The depression is emphasizing the place of the trained man. Every consideration of wage, time off, unemployment has come to the trained man. The untrained man has borne the brunt of the depression.

Never in the history of industrial-arts or vocational education has the vital need of the school been so obvious to all. Children and growing boys may continue to be as hard to sell as ever. To sell them requires real skill.

But the grown man can be sold 100 per cent on the school shop and on school training. The night schools during these times need little selling. They sell themselves because men appreciate the great need of education for success in life.

The depression, therefore, is the best opportunity to sell the school shop, and its need in life to the young. Every student ought now to be sold for life on the need of training. Education must teach us all to help ourselves, not out of the public purse, but by the ability to apply and utilize our training.

The demand for education by parents and pupils ought to mean little or no depression in the school shop. School boards will help in the budget where the need is greatest. Again, this is the golden hour to sell the industrial-arts and vocational education.

—*The Publisher*

THIS MONTH'S COVER

In the background of the picture on the cover is shown the bosh of a huge blast furnace. The molten charge is just being drawn off. In the foreground can be seen the channels through which the metal flows, and in the upper right-hand corner is an insert showing how the metal is poured into the ladles.

Photo courtesy American Steel & Wire Co., Chicago, Illinois.

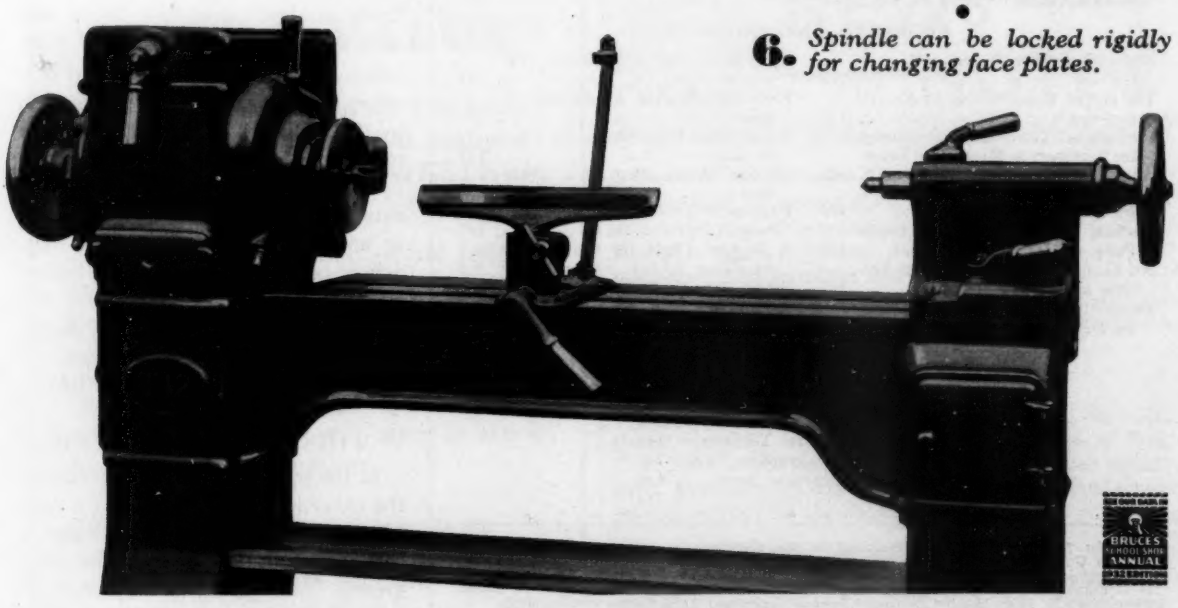
The Safety Lathe that . . . . Modern Instruction Demands

STUDENTS like to feel that they are learning a trade with machines such as they will use in actual work after they leave school, and instructors too are equally interested in using such tools in their class work. Furthermore they demand machines that are easy to adjust and operate and offer as much protection to the students as it is compatible with the work they do.

In the new T-12 SPEED LATHE we have combined skillful design and accurate workmanship,—essential requisites of the machinery intended for industrial plants,—and the simplicity of adjustment, the ease of operation and the safety features demanded by progressive instructors of our vocational and manual training schools.

Safety Features

1. *Motor cannot be accidentally started by moving the speed control lever.*
2. *Motor will start only when control lever is at lowest speed position and start button is pushed.*
3. *Top of push button is slightly below surface to prevent accidental starting.*
4. *When brake is applied the current is automatically shut off. Pressure on brake shoe is even regardless of pressure applied to lever.*
5. *Tool rest is universally adjustable with clamp lever in front, convenient to operator.*
6. *Spindle can be locked rigidly for changing face plates.*



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BELOIT, WISCONSIN, U. S. A.

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

VOLUME 21 APRIL, 1932 NUMBER 4

The Practical-Arts Courses and Vocational Choices

*Arthur B. Mays**

IN RECENT YEARS we have been hearing much about vocational guidance. Both the rapid increase in the complexity of economic life and the multiplication of courses and curricula in the schools have brought to the fore the need for guidance during school life. The interest in vocational guidance among young people is amazing, and our ignorance of how best to meet their wants is most disturbing to many of us. In casting about for effective means to aid our youth to find their way in the labyrinth of modern occupational life, we look over the school courses for subjects of study which will make definite contributions to guidance. At once the eye lights upon the practical-arts courses, for they appear to be exactly similar in content to certain well-known vocations; and the question arises immediately: "Why aren't these very valuable as testing experiences for the occupations?" Thus, without very much careful thought, there has come into educational literature an oft-repeated statement to the effect that a chief aim of the practical-arts courses in general education is vocational guidance.

Now let us examine this proposition and try to discover just what part the practical-arts courses can play in aiding young people to choose wisely the kind of vocations they should enter. In the first place, the real guidance needs of the children call for examination. What sort of help do children really need? Well, at the outset let us be sure of this: they don't need to be told just what vocation they ought to prepare for and enter. Their needs are more involved and less specific than that. In broad terms, their one great want is to be so prepared that when the time comes to make a decision, they will be equipped to make a wise one. Hence, the best purpose of vocational guidance is to equip boys and girls with facts, experiences, habits of thought, attitudes, and purposes that when they reach the point in their lives where a choice of occupations faces them, they will be prepared to meet it with as large a chance of success as their inherent powers make possible. So to choose, makes necessary the possession of something more than a few occupational facts. Indeed, men who know the most about the largest number of vocations may be the most puzzled when facing a choice of an occupation. The very abundance of their vocational knowledge may be the cause of their inability to make a satisfying choice. Likewise, a large knowledge of one's own powers and limitations may but lead to the greater confusion when facing a choice of a vocation. Knowledge of the occupations and of oneself is a valuable asset, undoubtedly, but it is far from being sufficient preparation for wise choosing. And this is true because success in life involves feelings, attitudes, ideals, and purposes to a greater degree than it does mere knowledge of facts. Hence, the guidance needs of young persons are extremely complex and much less tangible than *facts* which can be easily taught and acquired.

Practical Arts and Guidance

To choose intelligently requires moral courage, foresight, judgment, and purpose. And, merely to choose is not to enter a vocation with a reasonable chance of ultimate success, for one has to find and pass through an opening into the chosen occupation. Hence, vocational guidance must somehow help the young to develop those qualities of character and those major life purposes without which intelligent choices are not probable. And, besides, our young people must be trained how to find their way into the occupations chosen. Now such a definition of guidance includes some of the major ends of all purposeful education, and the "aptitude-testing" qualities of the practical-arts courses become less important than their disciplinary and educative qualities. They become good means of guidance chiefly in the degree to which they are good means of education. Obviously, a variety of practical-arts experiences may serve some boys and girls as

*Professor of Industrial Education, University of Illinois, Urbana, Illinois.

means of testing their personal "bents" toward or away from such types of work; but that such results accrue to very many may well be doubted. It is difficult to see how shopwork, drawing, millinery, filing, and shorthand are any more valuable as finding courses than are arithmetic, chemistry, English, and botany. Indeed, more vocations involve the experiences of the latter than of the former. There is a real danger involved in the insistence on the unique vocational-guidance values of the practical-arts courses. If we urge vocational guidance as a major objective, what will happen when it is generally discovered that they have little if any more such value than the other subjects in the curriculum? It seems to be a wiser course to make no claims for the practical-arts subjects that cannot be successfully defended, and surely their contribution to the educational purposes of contemporary society is great enough not to need an unsupportable claim of unique vocational-guidance values.

Like other important school activities, however, the practical-arts courses may be made to contribute very largely to vocational guidance. When course makers and teachers conspire to use these courses to help young people to prepare for wise choosing and successful beginning of vocational careers, they will find much of value for guidance purposes. Through the obvious similarity of practical-arts activities to certain commonly known vocations, it is easily possible to direct attention to, and to stimulate an intelligent interest in, these vocations; and starting thus, to lead youth out and on to an ever-widening understanding of the occupational life of the community. Such an expansion of understanding and interest is not likely to result unless it be deliberately planned and brought about by the teachers. A teacher of home economics has an excellent opportunity to lead her pupils into an enlightening and valuable interest in the numerous occupations concerned with the production, transportation, preparation, and distribution of the many articles of food consumed by civilized man. She has similar opportunities in the fields of clothing, house furnishing and decoration, and child care. Even a cursory examination of these divisions of economic and social activities reveals the information and interest-stimulating possibilities they bear, with reference to a very large number of vocations. But it is as easily seen that few children will even think of the vocations concerned in the study of foods, clothes, and house furnishing unless a deliberate and skillful effort is made by the teacher to show this aspect of the subject to them. In like manner, all the practical-arts courses may be made to yield interest and information of value in vocational guidance. Few teachers, however, seem to show any great concern for the guidance possibilities of their teaching.

Habits, Attitudes, and Ideals

As suggested before, the most important features of practical-arts teaching, which affect the purposes of guidance, are probably to be found in the educative outcomes of such teaching. Is the teacher primarily concerned with the habits, attitudes, ideals, and major purposes which are affected by his teaching? Or, is he chiefly interested in turning out a striking group of products made of clay, wood, metal, and fiber or finished projects in office work, or home economics? It is in the answers to these questions that the presence or absence of vocational-guidance values of the practical-arts courses is to be sought. If the material products of shop or laboratory form the major factor in the teacher's mind, the guidance values in his teaching are likely to be unimportant if, indeed, there be any. If the character and personality outcomes are paramount, a very important contribution to guidance is a probable result of the teaching.

Those of us who have spent much time in counseling young persons about their vocational choices are often impressed with the lack of any guiding principle in the thinking of the youth who is facing the important step of starting his productive career. Rarely does a young man indicate that he has any sort of life purpose. The questions usually raised deal with likes and dislikes, chances to get ahead quickly, speed of preparation, and the like. Occasionally, one has come to see the possibility of a certain kind of investment of his future, and wants to know how such an investment may be made. To such a one, the particular vocation is only one item of importance in his problem, and he may be equally interested in several occupations which will enable him to carry out his major purpose. Such a young person is in a much better position to choose wisely not only his first vocation but later ones, which success, or other vicissitudes of life, may cause him to select. Hence, it seems clear that a type of guidance which leads to a controlling purpose is to be preferred to a standardized procedure which merely gives facts and experiences. Now an able teacher who sees beyond the job in hand to the young person and his future, can easily use the practical-arts experiences to help his pupil to adopt a large controlling purpose. Would it be extravagant to hope that a youth might thus come to determine that he wanted to devote his life in some, as yet unknown, way to the creation of beauty? The desire both to create something and to create beauty might well find its birthplace in the shop or drawing room, in the sewing room or interior-decoration class. If such a birth occurs, it makes no vital difference, in the long run, whether this youth becomes a composer of music, verse, or fiction, a painter of pictures, a photographer, a designer of clothes, a designer of wall paper, of automobile bodies or houses. The big thing in such a life is the creation of beauty. The particular vocation through which such a purpose finds expression is important, of course, but it is not the *vital* consideration in a vocational choice. In like manner, a purpose to manufacture useful products which make life more effective, to render some kind of direct social service, to plan an important part in some great division of economic activity, such as communication, transportation, management, and the like, may also

come to birth in the practical-arts room, under a teacher who is cognizant of the broader and more fundamental guidance possibilities in this field of teaching.

A constant insistance on good thinking habits when dealing with practical-arts problems, on good work habits, on perfect honesty, and on high standards of workmanship and behavior will contribute to the ability to get and hold jobs in the occupational world. The popular slogan of industry, often heard a few years ago, namely, "We are only concerned with results," is no proper slogan for a practical-arts teacher, unless it be carefully interpreted. If the results are merely accurately constructed pieces of furniture, neat, accurate sets of accounts, neatly types exercises, well-made dresses, etc., then the experience is of little value either as education or guidance. The important outcome of the whole matter is the manner of doing the work, and the resultant attitudes, habits, ideals, and purposes which it engenders.

Such an outcome is one we may reasonably expect from such rich subject matter as that inherent in the practical arts. The responsibility for obtaining genuinely educative results, and hence valuable guidance, rests with the teacher. He will have many opportunities through private conferences, the making of course outlines, through class talks, class assignments, standards of attainment and of conduct, and through his personal example to reach such ends. The all-too-common practice of making these outcomes incidental to skill, rather than the major purpose, endangers the future of the practical arts in education. If they be not the *chief* purpose, then how can these courses be justified in the schools? To speak vaguely of "handyman activities," and "aptitude testing" as objectives, leaves them in a most painful and precarious position. It is better to put into the practical-arts work of the schools solid values of educative significance. If this is done, we may with good reason expect as results intellectual and moral powers which will make wise choices both possible and probable.

Industrial Education in the Hamtramck Public Schools

*Harold J. Van Westrienen**

THE city of Hamtramck is a separate municipality which is entirely surrounded by the city of Detroit. The city covers an area of 2.09 square miles and has no opportunity for territorial expansion.

Hamtramck was named after Col. John Francis Hamtramck, who was an officer in the American army during the Revolutionary War. It was first organized in 1901 as a village, and received its city charter in 1922. The growth in population during this period was phenomenal. In 1910 the federal census showed a population of 3,559. By 1920 it reached 48,615 and according to the 1930 government census it is now beyond the 56,000 mark.

The city of Hamtramck is essentially an industrial community and has among its industries, Dodge Bros., Briggs Manufacturing Company, Acme White Lead Works, Truscon Laboratories, Champion Porcelain Company, Fisher Body Company, American Radiator Company, Michigan Smelting and Refining Company, Chevrolet General Motors, and several smaller concerns. The character of the community necessarily plays a large part in determining many of the educational policies of its system of public education, specifically the program of industrial education.

General Educational Policies

After three or four years of preliminary study the board of education of Hamtramck took definite steps to provide for its citizens a program of education that was educationally sound and adequate to the local needs. In 1926, a comprehensive survey was made to determine the present and future needs in regard to housing the children of Hamtramck. Since that time, a continuous self-survey has been in operation in regard to all of its educational needs.

The problem of housing was followed by the development of a sound philosophy of education and organization embracing all of the legislative, executive, administrative, and instructional functions of the board of education and the entire school staff. The policies that were adopted are embodied in *The Public School Code of the Hamtramck, Michigan, Public Schools,* published in 1927. With the *Code* as a guide, continuous progress has since been made in accomplishing the many goals and provisions which it sets forth.

The administrative organization of the Hamtramck public schools offers a liberal program of industrial education to provide for the specific vocational needs of the community. A description of the provisions for this type of activity is outlined in the succeeding paragraphs.

The Junior High School

Purpose

"The program of the junior high school shall be based upon the larger demands of society, and the individual and social needs of the children. It shall be specifically organized to meet the needs of adolescent

*Director of Vocational Education, Hamtramck, Michigan.

children between the ages, approximately, of 13 and 16 years and shall be adjusted to the nature of child life between these ages. The junior high school shall carry forward the work of the elementary school and at the same time provide sufficient differentiation to care for the abilities, capacities, aptitudes, and exploratory needs of the primary adolescent. All curricular differentiation shall be made in such a manner as to reduce to a minimum loss in change from one course to another. It is expected that each child, upon leaving the junior high school, will have made a vocational choice within the larger fields."[1]

[1]*Hamtramck Public School Code*, p. 112.

Industrial Program

One sixth of the time of the junior high school is allotted to prevocational activities. The program is compulsory for the seventh and eighth grade and embraces a variety of activities tending to help the boy in selecting his vocational choice.

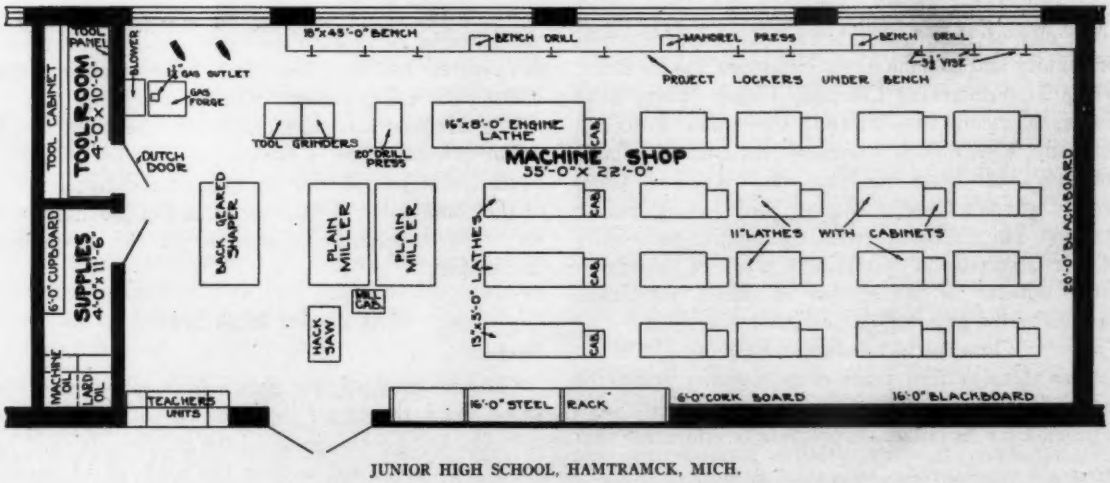
MACHINE SHOP, VOCATIONAL SCHOOL, HAMTRAMCK, MICH.

Tryout Courses

These courses comprise eight 10-week units as follows:

7B — Woodworking and Model Airplane

This course offers experiences with the processes and tools used in hand woodworking, and the opportunity



JUNIOR HIGH SCHOOL, HAMTRAMCK, MICH.

of making one model airplane as an introduction to this rapidly growing industry.

The administrative organization of the Hamtramck public schools offers a liberal program of industrial education to provide for the specific vocational needs of the community. A description of the provisions for this type of activity is outlined in the succeeding paragraphs.

Printing

In this course the boy is introduced to the setting of type, making the proof, simple proofreading, stitching, folding and assembling, locking up a simple form in the chase, make-ready and feeding the platen press.

8B — Household Mechanics

This course is built around the handy-man duties

MACHINE SHOP, COPERNICUS JUNIOR HIGH SCHOOL, HAMTRAMCK, MICH.

Blue-Print Reading

Free-hand sketching and a small amount of mechanical drawing gives the boy a background that will aid him in the various shop courses requiring the reading of blue prints.

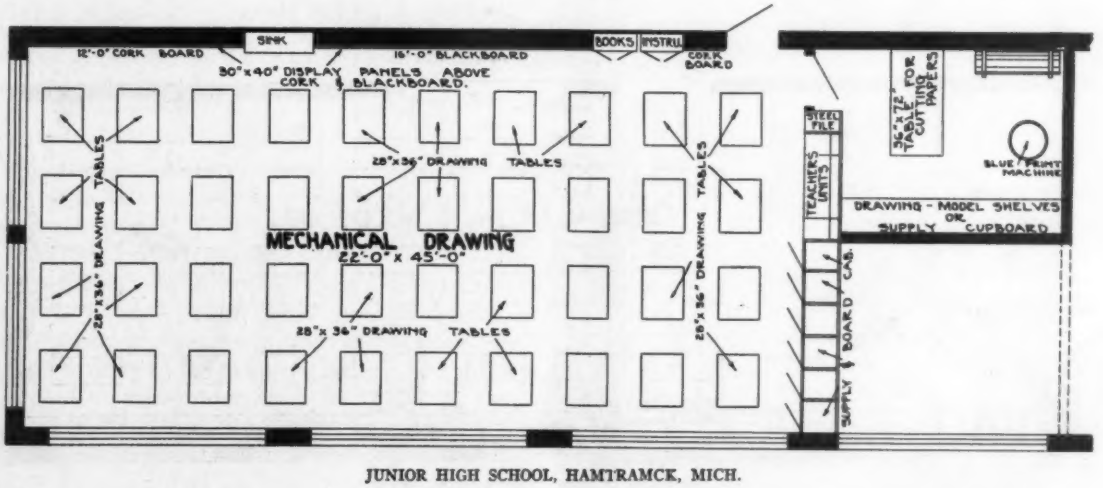
7A — Bench Metal Work

Hand metal-working tools are used in the construction of simple projects with the use of band iron. The tool processes used include hack-sawing, filing, riveting, drilling, countersinking, peening, chiseling, and bending of soft metals.

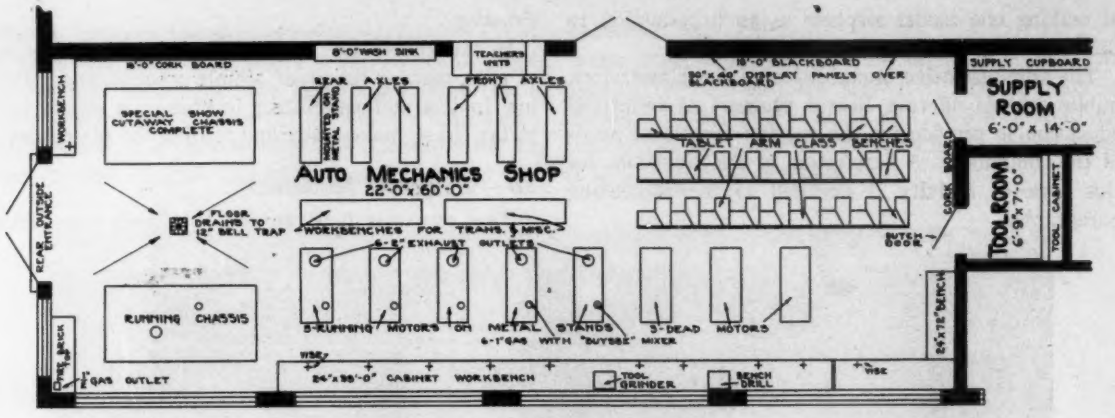
common to the needs of the modern home. The course includes simple operations in sheet metal, plumbing, glazing, sharpening of tools, bell wiring, and miscellaneous jobs.

Mechanical Drawing

With the course in blue-print reading as a background, the student is introduced to elementary drawing in the fields of sheet metal, electrical, plumbing, automotive, aëronautical, machine and architectural drawing. As far as possible, the work is related to the work done in the other shops.



JUNIOR HIGH SCHOOL, HAMTRAMCK, MICH.



JUNIOR HIGH SCHOOL, HAMTRAMCK, MICH.

8A — Auto Mechanics

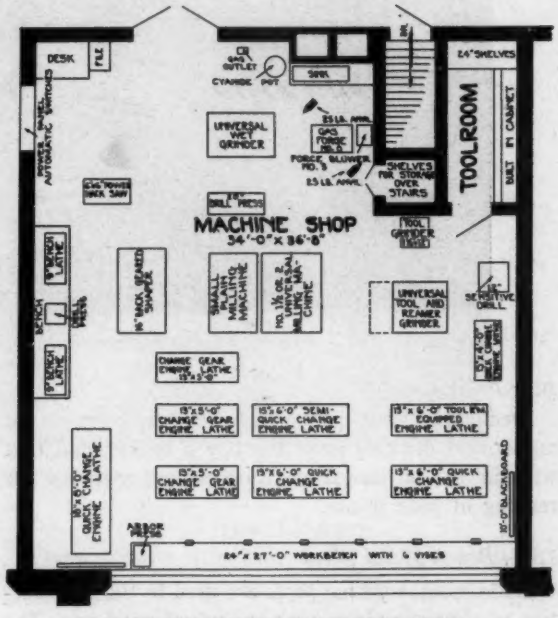
In organizing this course the needs of the car owner were kept in mind. The boy is introduced to the principles of the internal-combustion engine, in an elementary manner. The activities include lubrication, repair of tires, the care of the battery, washing and polishing, simple electrical and mechanical adjustments, and the operation of the automobile. Some time is also devoted to driving courtesy and laws governing the motor vehicle.

Machine Shop

The work in this course involves the construction of simple, usable projects requiring the use of the lathe, milling machine, shaper, benchwork, cylindrical grinding, and tool forging.

Ninth-Grade Elective Courses

After completing the eighth grade the student elects one of several curricula. These include the college preparatory, commercial, general industrial, and all-day trade. A number of courses in industrial activities are available for the general industrial and college-preparatory group. The purpose may be general education, technical, or avocational, depending upon the needs of the student. The following courses are available:

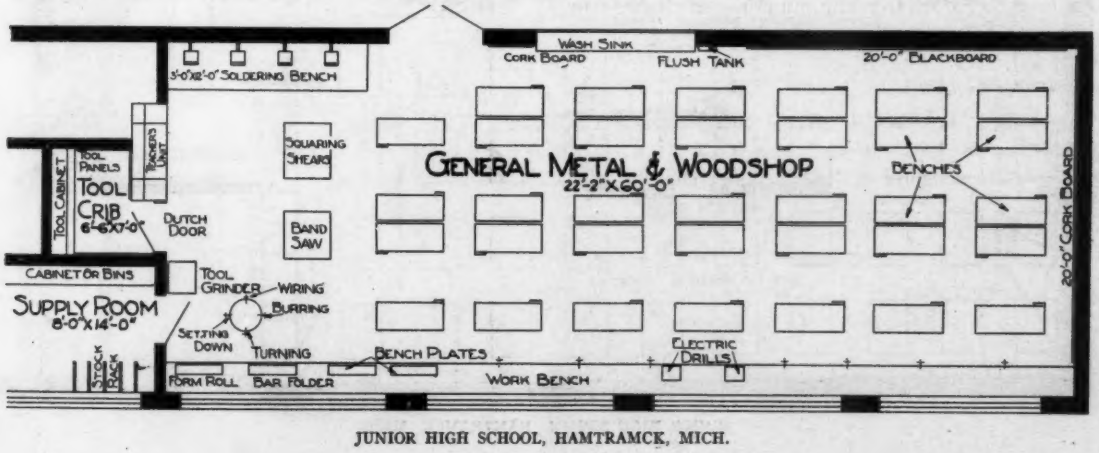


VOCATIONAL SCHOOL, HAMTRAMCK, MICH.

Aëronautics: Building and flying model airplanes.

Auto Mechanics: Elementary principles on a laboratory basis.

Drawing: A general course in mechanical drawing



JUNIOR HIGH SCHOOL, HAMTRAMCK, MICH.

and a course covering sketching and all types of pictorial drawing. These courses are prerequisite to all other advanced courses.

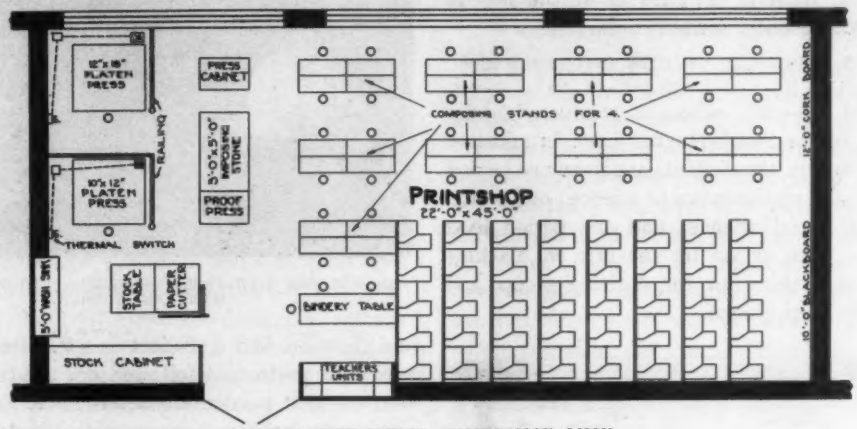
Household Mechanics: Advanced work in any branch of the 8B — Tryout course.

Machine-Shop Practice: Advanced machine operations.

Printing and Bookbinding: Advanced composition and imposition, etc.

Radio: A study of the principles of radio transmission and reception; sending and receiving by code; and the construction of all types of receiving sets from the crystal detector to the superheterodyne.

Woodworking and Patternmaking: Advanced bench and machine woodworking and elementary pattern-making. This work includes wood finishing, estimating, and some production work.



JUNIOR HIGH SCHOOL, HAMTRAMCK, MICH.

Machine Shop: A general course covering elementary machine-shop practice.

Printing: A general introduction to the printing industry.

Woodworking: This course involves elementary bench woodworking.

Senior High School

Purpose

"The program of the senior high school shall be based upon the larger demands of society, and the individual and social needs of the children. It shall be specifically organized to meet the needs of adolescent children between the ages, approximately, of 16 and 18 years and shall be adjusted to the nature of child life between these ages. The senior high school carries forward the work of the junior high school, providing, however, for greater curricular differentiation to care for the abilities, capacities, aptitudes, and vocational needs of the secondary adolescent. In general, all curricular differentiation shall be made in such a manner as to reduce to a minimum loss in change from one course to another."[2]

Industrial Program

The senior-high-school program offers advanced work in the elective courses of the junior high school with additional subjects that are beyond the comprehension of the ninth-grade student.

Aëronautics: Principles of flight; aërodynamics; elementary meteorology; engine principles; repair of the airplane; airplane design, and construction of scale models that are tested in a wind tunnel; and air laws.

Auto Mechanics: Advanced.

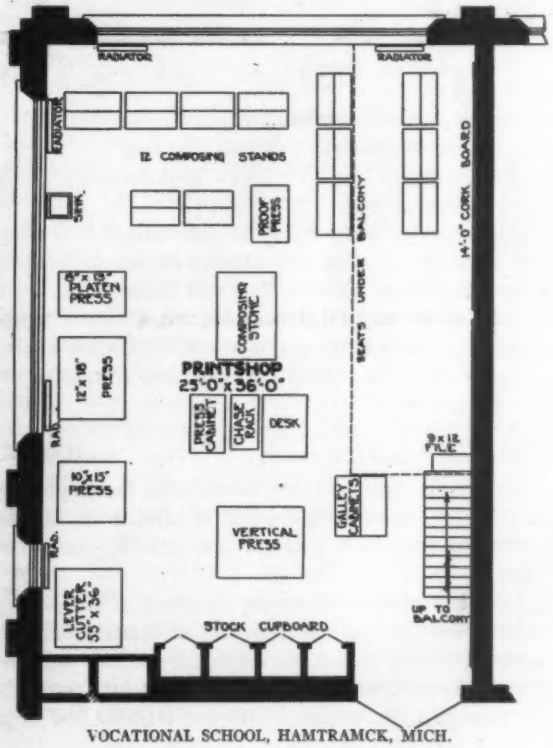
Drawing: Advanced work with the opportunity to major in architectural, machine or sheet metal.

[2]*Hamtramck Public School Code*, p. 122.

All-Day Trade School

Purpose

The program of the all-day trade school is based upon the larger demands of society, and the individual

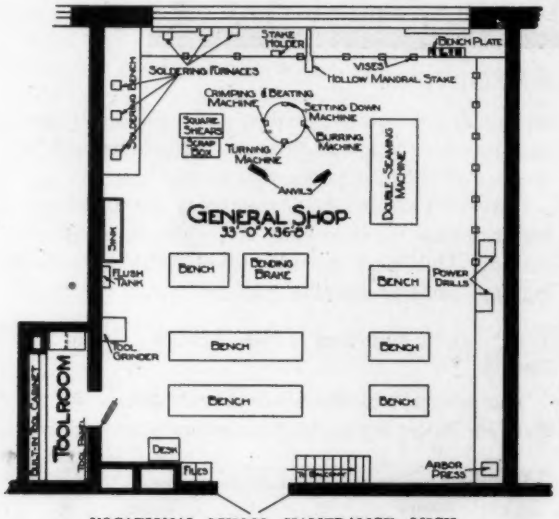


VOCATIONAL SCHOOL, HAMTRAMCK, MICH.

and social needs of the boy. It is specifically organized to meet the needs of the boy of 15 to 18 years who finds it desirable to acquire skill in a specific occupation. The all-day trade school draws its students from both the junior and senior high school and provides specific training designed to fit the boy to enter a definite branch of industry.

Program

The work of the trade school is conducted under the provisions of the Smith-Hughes Law. In addition to the major subjects, the students are given one period each day in related mathematics or science; one period in English and social science; and one period in a related subject, such as art for the printer, machine shop and patternmaking for the drafting group, and drafting for the shop groups.



VOCATIONAL SCHOOL, HAMTRAMCK, MICH.

The major courses offered at present include:

a) Auto mechanics
b) Drafting
c) Machine shop
d) Printing
e) Woodworking

One period a week from the time allotted to shop mathematics and science is devoted to the showing of industrial motion pictures that will increase the boy's knowledge of natural resources and manufacturing processes related to his line of work. Each class is also given two periods a week of supervised recreation on the playground.

Coördination and Placement

Periodic contacts are maintained with the employers of trade graduates. This work is carried on by the trade teachers and through the school placement bureau.

Industry for some time was skeptical of the ability of a public school to provide adequately trained apprentices. This lack of confidence could only be broken down through personal contacts by the teachers who had the responsibility for training the boys

GENERAL-SHOP TOOL CRIB, COPERNICUS JUNIOR HIGH SCHOOL, HAMTRAMCK, MICH.

and therefore had a product to sell. After a placement was once made, and followed up, the battle was half won for that particular concern. Due to the wide acquaintance among shop superintendents, a few satisfactory placements soon make many friends. The only problem then was to follow up placements, detect deficiencies, and make corrections. The boy that has been placed is called into evening school and given remedial or advanced work, and the regular shop program is adjusted so that future graduates will be better prepared. The ability to place graduates during the present depression has justified the program.

Part-Time Continuation School

The work in this school is to provide for all students between the ages of 15 and 17 who are not enrolled in the all-day school, and is conducted according to the provisions of the Smith-Hughes Law and the state laws of Michigan. Each student must attend one 8-hour day each week. One half of the day is devoted to academic work and one half to a general shop course

TEACHER'S CABINET UNIT, COPERNICUS JUNIOR HIGH SCHOOL, HAMTRAMCK, MICH.

involving a variety of industrial activities. The academic time is devoted to the development of some topic involving a community problem, health, or some general topic, such as savings, the postal system, taxation, etc. The academic lesson includes English, social science, and mathematics, and whenever possible, related motion pictures.

Adult Evening Classes

For the past eight years there has been a growing demand for industrial work in the evening school. Every school shop in the city is operated to capacity four evenings a week, and because of the increased demand, it has been necessary to conduct Saturday classes, and afternoon classes in some subjects where rooms are available from 4 to 6 p.m.

Any course is offered where the demand is sufficient to warrant the hiring of a teacher. The most popular courses have been machine shop, drafting and blueprint reading, printing, aëronautics, shop mathematics, radio, auto mechanics, and woodworking. Carpentry, sheet metal, plumbing, electricity, and bench metal work are other courses that have been offered at various times as the need arose or the demand warranted.

Housing Provisions for Industrial Work

All of the industrial work in Hamtramck is conducted in two school buildings. The vocational school is operated from 8 a.m. until 9 p.m., as the demand requires, and accommodates the senior-high-school industrial arts, the continuation school, the all-day trade, most of the evening school, and a few junior-high-school classes. The shops contained in this building are as follows:

Drawing rooms; printshop; machine woodshop; machine shop; radio and related-science laboratory; general shop for sheet metal; electrical and plumbing work; academic classrooms; office; aëronautics and auto shop. Some of the rooms are so designed that they may be used for other shop subjects in case of an overload in the regular room.

The balance of the work is housed in the new Copernicus Junior High School. This building contains a printshop, auto-mechanics laboratory, drawing room, machine shop, and general shop. Here again the shops were designed to accommodate more than one type of work and provide very flexible housing facilities. The Copernicus school is as modern, artistic, well arranged, and educationally complete as it was possible for the school staff and the architect to make it. Because of its unique features it has been the visiting place for large numbers of delegations from all parts of the country.

Some of the shops may appear overworked, but when the large proportionate cost of equipping industrial work is taken into consideration, there is no reason why its use should be limited to six periods a day. Some of the vocational-school shops have been in operation for as high as 64 hours a week. It would be out of the question to provide enough shops to satisfy the local demand on the traditional basis. The only factor that is a problem is the use of more than one teacher in a room, and that has not been serious.

Classroom Organization and Methods

In accordance with the philosophy of education outlined in the *Code*, the classroom methods have been adjusted to meet the needs of a democracy.

Subject matter and projects are largely determined by the subject taken and the room in which the class is conducted. These have little effect on *method* which determines what the boy will be like or act like when he leaves school as an adult citizen. The boy can *develop* vision, self-direction, self-control, self-appraisal, and coöperation, just as well in one subject as another, provided the teacher is equally efficient. The only difference is that a slightly different technique is used in each case. With proper guidance the students can be *conditioned* in helpfulness, kindness, neatness, accuracy, honesty, courtesy, coöperation, dependability, and many other desirable qualities. The results in each case are dependent upon teacher method and not upon subject matter, equipment, room, etc.

By the use of the "purposeful-activity" method of instruction, the students assume responsibility for the major part of the routine and administrative classwork. The boys elect their own officers; make their own rules; appraise their own work; select and plan their own projects; handle their own discipline; assume responsibility for the room and equipment; and do it coöperatively under teacher guidance — not domination. The teacher is thus left free to devote the major portion of his time to actual teaching.

Lesson sheets and instruction sheets play a big part in providing individualized instruction and relieving the teacher of much formalized lecture work. The manner in which the lessons are written make the work purposeful and not teacher directed. The objectives are in terms of personality development, and subject-matter goals are by-products of instructions. Projects and activities are *means* to an end, not ends in themselves. Boys that are motivated by worthy purposes, and not driven, do better work and require much less watching. They do, however, demand much more individual attention of the teacher. The teachers and pupils work coöperatively and there is no attitude of superiority shown by the teacher.

Conclusion

The foregoing descriptions were designed to show a unity of purpose in all the factors in the Hamtramck system. The objectives set forth in the *Hamtramck Public School Code* have not been fully realized, all rooms are not equipped 100 per cent, and all teachers have not achieved 100 per cent perfection in control over method, but progress has been evident, consistent, and in the direction of a definite goal.

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

J. J. METZ, Editor

COORDINATING ONE'S EFFORTS

Shop teachers in many cities, working in groups or committees, are rendering real service to the cause of industrial-arts and vocational education by their labors in the formulation of proper objectives for their work, the setting up of new outlines of instruction, the production of units of instruction, the gathering and mounting of illustrative material, and the devising of special tests for checking teaching results.

Much valuable material is being produced in this way, and it is to the credit of the shop teachers that so much progress is made. There are, however, some individuals who have never learned to work with others in the furthering of a matter of common interest. These can usually be classified under two headings—either they belong to those who are incapable of personally producing that which is wanted, or they belong to that class who must do everything themselves before they accept it as being worth while.

It is strange how few are able perfectly to coördinate their work with that of others. Yet if the members of such a group thought for just a moment, they would at once see how much this working together helps the individual. Assume for a moment that there are five woodworking teachers in a system and that each of them is to prepare an instruction sheet for each week of a 10 weeks' course. The aggregate then would be 5 times 10, or 50 individual instruction sheets for the group.

If, instead of attacking the job individually, these five had discussed the work in a committee meeting, had set up certain requirements, determined the content of the individual lessons, and then assigned the preparation of two lessons to each one of the committee members, the composite efforts would have resulted in 10 lessons, which after all is the number needed. In this way much work and gray matter would have been conserved—a thing that is of vital importance to the teaching fraternity, which has enough work as it is, without doing anything that merely duplicates the work of others.

The tactics of both of these two noncoördinating types of individuals are usually the same. They raise so many objections, and do so much talking at each of the committee meetings, that nothing can be accomplished. In this way much useful time is frittered away to the detriment of the entire project. Remembering the biblical statement, "by their fruits ye shall know them," it is well for teachers who use these obstructionistic methods whenever they are asked to work with others, to spend a few minutes in introspection in order to determine, at least for their own satisfaction, whether they belong to those who do not know how to do the required work or whether they are not fitted to coördinate their efforts in the production of a given project.

Having once determined to what group one belongs, it is then a matter of self-training. For the one it means more education, and the other should remember that it is not necessary to be a "yes man" in order to be able to work with others, but that it does require good judgment, tact, and the willingness to make one's efforts dovetail with those of others. In other words, that it means working for the cause, not merely for personal aggrandizement.

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WHEN, OH WHEN!

In the early days of the public school, the 3 R's were confronted with the problem of fighting for their very existence. It was held by many at that time, that it was unfair to burden the few with the expense of educating the many. Some even contended that it was best for many not to be able to read and write.

That day is long past, and the academic subjects in our system of education have long ago been accepted as necessary and proper. It would seem, however, that the experience of the struggle to arrive at the point of acceptance would linger in the minds of those who administered our educational system and make them feel sympathetically inclined toward other subjects that are still in the struggling stage of their existence. This does not seem to be the case, for we frequently find the teachers of the older subjects aligned with those who look upon the subjects that modern conditions have added to the curriculum, as though they were intruders who deserved no other fate than to be thrown out.

These attitudes of unfriendliness often crop out in ways that are positively ludicrous. It seems, for instance, that the industrial-arts teachers must be shown that they do not yet belong to the official family and it must be done constantly and consistently. One of the petty ways of treating these stepchildren of the educational family appeared lately in a certain high-school annual. A whole page was devoted to a listing of the names of the faculty. The teachers of mathematics, Latin, English, history, science, music, etc., were listed alphabetically. Knowing some of the industrial-arts teachers engaged at that school, the writer proceeded to find out whether they had been listed. After vainly looking for their names under their respective letters, he was about to give up the search when he accidentally saw that the names of the shop and home-economics teachers had been added, helter-skelter, at the end of the list.

It seemed as though someone feared that the names of these teachers, when placed in their proper position in the list, might in some way contaminate the others. Evidently the industrial-arts teachers were not even

worthy of having their names alphabetically arranged, even after they had been thrown out of the communion of the elect—at any rate, there their names were at the end of the list and in the order in which they happened to come into the mind of the one who made out the list.

When, oh when, will industrial-arts and vocational teachers be admitted as full-fledged members of the teaching fraternity with all the privileges and honors that may go with such membership?

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STREAMLINE BODIES

Engineering experts have spent much time in trying to devise ways and means to eliminate friction and deleterious resistances that spell power wastage. In line with this, we find airplanes, automobiles, and power boats all designed with what are known as streamline bodies which reduce air friction and resistances to a minimum so that as much as possible of the power available may be used for attaining speed and covering distance.

To produce a real streamline body requires knowledge, patient experimentation, careful deduction, and ingenious adaptation of the materials that are being used. Even after a design has been adopted, it may be found necessary to cast it aside and start all over again, because further experiments with the finished project may show up details that had been overlooked in the model. All of this extra work, however, is cheerfully undertaken because the improvements thereby achieved will more than compensate for it.

Industrial-arts and vocational education, figuratively, also can be designed with a streamline body. A little study of how to make a course more appealing to the student may spell the difference between a course that is just suffered in the curriculum and one that is pointed to with pride by supervisor, principal, and superintendent. This is one way of removing educational resistance.

An earnest endeavor to apply modern methods of school-shop management may change teacher drudgery and near failure into pleasurable work and success. This is another way of making this type of educational endeavor work more smoothly and efficiently.

A well-outlined shop course, giving tangible evidence of forethought and planning, showing what is expected of the student and what the student may reasonably expect from the course also is conducive to the popularization of the industrial-arts type of education.

Properly written and well-illustrated instruction sheets, demonstrating that the outline of the course is not merely for appearance, are great popularizers of courses and do much to reduce preconceived objections to schoolwork.

Carefully planned publicity schedules help to permanently sell this type of work, not only to the students, but to the parents of those who are taking the courses, to the entire faculty of the school at which the work is given, to the educational administrators of the town, and to the taxpayers in general.

With all of the foregoing taken care of, the general design of the structure of industrial-arts and vocational education has been roughly hewn to shape so as to reduce the more common forces which may retard or obstruct the starting, carrying on, and perpetuation of this type of educational work. More refinement, however, is still possible, and this depends upon the teacher himself. Man may not be able to beautify his own facial expression, or to change the appearance or form of some of his bodily members, but he is capable of changing habits and mannerisms that may make him more or less offensive to others. It is especially the teacher who has to take this seriously to heart. It is his personality which impinges on the student's perception first, and this first impression in many cases makes or breaks the progress which the student achieves in a given course.

Temperament, personal likes and dislikes, inclinations toward harshness, imperiousness, sarcasm, etc., must therefore be carefully watched and be constantly kept under control by the teacher who wants to make his personality contribute to, rather than detract from, the efficiency and progress of his work.

Engineers are confronted with a huge task in solving their physical streamline-body problems, but teachers have a much larger responsibility before them, and their problem is so much more difficult because they have to apply a streamline body to an entity that is largely intangible.

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VOCATIONAL REHABILITATION

Bill H.R. 4743, which is to extend for a period of four years "the vocational-rehabilitation functions of the Federal Board for Vocational Education, was ordered favorably reported to the House by the Committee on Education February 24.

"The present act covering this service expires June 30, 1933. The bill, which would put rehabilitation on a permanent basis with a $1,500,000 appropriation, and an allotment of $100,000 annually for headquarters expenses in Washington, was amended by the Committee to limit the time, reduce the appropriations to $1,000,000, and provide that the headquarters be maintained on the present basis of $80,000 annually."

No doubt, this bill will be favorably acted upon. There ought be no question about it, however, and there would be none if everyone were thoroughly acquainted with the results that have been obtained in this work of salvaging humanity's derelicts during the few years in which the present act has functioned. Anyone who has seen hope rekindled and earning ability reëstablished by this type of vocational education after illness or accident had placed a worker *hors de combat*, needs no further proof to feel thoroughly in sympathy with this type of educational work.

Sheets from a Stage Carpenter's Notebook

*Page Kirk**

(Continued from the March issue)

Shakespearean

REPERTOIRES of most schools and colleges include Shakespeare. Before each program is presented, war rages as to which type of setting is to be used. The range runs from curtains and a bench, as popularized by Ben Greet, to Barrymore's staging with Hamlet in a dress suit. The three most generally acceptable schemes are:

1. An historic copy of the Elizabethan theater or courtyard.

2. A curtain cyclorama with the few necessary seats, couches, tables, etc., called for by the action of the play.

3. A picture of the time and place as called for by the text.

There is no "right" about any one of them; it is entirely a matter of individual choice and of available equipment.

As far as the stage carpenter is concerned, the first plan reduces his problem to one of scenery alone. In this age of good reproductions, borrow or rent an old English refectory table and benches with chairs to correspond. The wood of that period was oak, stained and weathered until it was almost black. Posts and legs were heavy, and they were either turned, or turned and carved. Table tops were thick. To make such furniture is expensive because of the amount of wood required, and it involved an unreasonable amount of work for the shop.

The second is generally the most successful especially if tapestry effects are combined with a plain cyclorama, and if the stage electrician has a flair for painting with lights. By using ingenuity as to change of cushions, overthrows and the like, also by varying the combinations of furniture, the designs given in Figure 3 are adequate for any play, Shakespearean or otherwise. They are the most utilitarian type of them all. But please keep the stage in horizontal and vertical lines; unless you are a genius who may break all laws with impunity.

The problem in the third scheme is that of a play which uses, to the full, beauty obtainable with modern scenery and modern lighting. Doubtless Shakespeare would have used them if he had written in the age of mechanical ingenuity and of electricity. He can hardly be imagined as throwing away such invaluable assets. The only objections are delayed action caused by scene shifting, and excessive cost of materials and labor. The "Twelfth Night" so staged, required twelve shifts. Of course, some of them were resets and some were rearrangements of parts borrowed from others, but it was necessary to build four different, complete scenes. "A Midsummer Night's Dream" and "A Winter's Tale" are laid in Greece, "Julius Cæsar" in Rome, and "Cæsar and Cleopatra" in Egypt then under Roman influence. Figure 1 shows furniture which may be used for all four plays, except that "Cæsar and Cleopatra," in addition should have some typically Egyptian pieces and all properties should be Egyptian.

Seat

Bill of Material

Wall board: One piece 4 by 10 ft., or one piece 4 by 8 ft., and one 4 by 2 ft., cut into: Two 28 by 48-in. lengths, for back and front of seat. One 11 by 42-in. length, for front of back. Two 22 by 28-in. lengths, for sides. Two 11 by 19-in. lengths, for inside of arms.

Wood: Three pieces 2 by 3 in. by 10 ft., cut into: Two 48-in. lengths, for top of back A and lower front brace B. One 44-in. length, for upper front brace C. Four 24-in. lengths, for uprights D. Two 22-in. lengths, for arms E. Two 20-in. lengths, for lower side braces F. Two 2½-in. lengths, for leg blocks G. Two 6-in. lengths, for arm blocks H. Three pieces 1 by 3 in. by 14 ft., cut into two 48-in. lengths, for back braces J, fifteen 22-in. lengths, for seat and two 22-in. lengths, for upper side braces K.

1 pc. 2 by 3 by 48 in.	Top of Back A
1 pc. 2 by 3 by 48 in.	Lower Front Brace B
1 pc. 2 by 3 by 44 in.	Upper Front Brace C
4 pc. 2 by 3 by 24 in.	Uprights D
2 pc. 2 by 3 by 22 in.	Arms E
2 pc. 2 by 3 by 20 in.	Lower Side Braces F
2 pc. 2 by 3 by 2½ in.	Leg Blocks G
2 pc. 2 by 3 by 6 in.	Arm Blocks H
2 pc. 1 by 3 by 48 in.	Back Braces J
2 pc. 1 by 3 by 22 in.	Side Braces K
15 pc. 1 by 3 by 22 in.	Seat

Construction. The upper front brace B and upper back brace J are built for strength, since they are the points of strain. If desired, the seat may be covered with wall board and the back left unfinished. The curves at the base should be drawn directly on the wall board. Use a compass. The direction of lapping is important. Since the front is generally toward the audience, it should overlap the sides and the sides should overlap the back. The end of the arms and the front of the seat should be faced with one piece. Paint the stone gray or some tone of the back curtain.

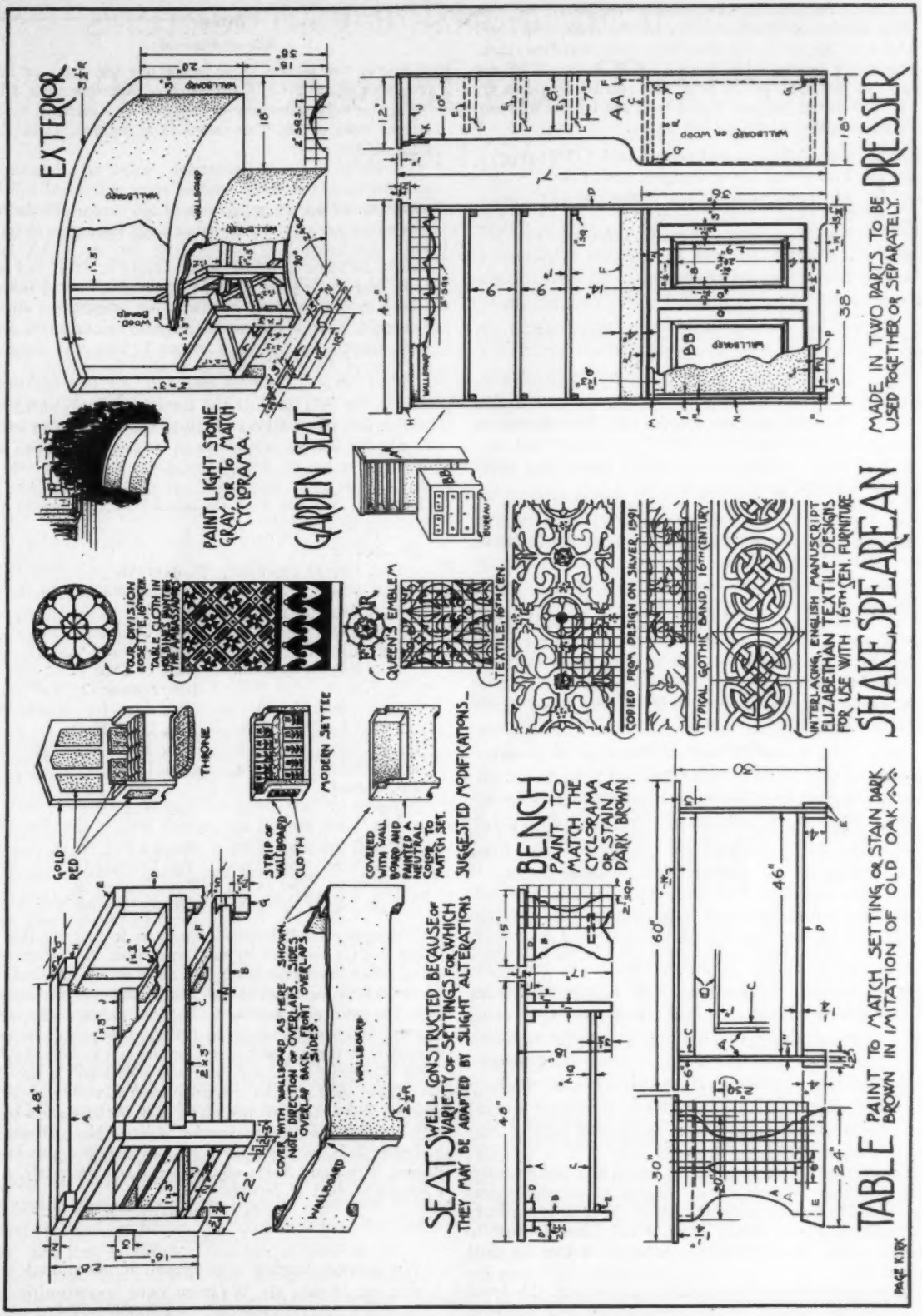
Of all the designs, this seat is most useful. It is acceptable in any period. A false top may be added when a throne or settle is required.

Curved Garden Bench

Bill of Material

Wall board: Two pieces 4 ft. by 8 in. (without seat) on two pieces, one 4 ft. by 8 in., one 4 ft. by 10 ft. (with seat), cut

*Washington, D. C.


EXTERIOR
PAINT LIGHT STONE GRAY, OR TO MATCH CYCLORAMA.
GARDEN SEAT
DRESSER
MADE IN TWO PARTS TO BE USED TOGETHER OR SEPARATELY
SHAKESPEAREAN
FOUR DIVISION ROSETTE, 16TH CEN.
TABLE CLOTH IN TRADITIONAL PATTERN
QUEEN'S EMBLEM
TEXTILE, 16TH CEN.
COPIED FROM DESIGN ON SILVER, 1591
TYPICAL GOTHIC BAND, 16TH CENTURY
INTERLACING, ENGLISH MANUSCRIPT
ELIZABETHAN TEXTILE DESIGNS FOR USE WITH 16TH CEN. FURNITURE
THRONE
GOLD
RED
MODERN SETTEE
STRIP OF WALLBOARD
CLOTH
COVERED WITH WALL BOARD AND PAINTED A NEUTRAL COLOR TO MATCH SET.
SUGGESTED MODIFICATIONS
BENCH
PAINT TO MATCH THE CYCLORAMA OR STAIN A DARK BROWN
SEATS
WELL CONSTRUCTED BECAUSE OF VARIETY OF SETTINGS FOR WHICH THEY MAY BE ADAPTED BY SLIGHT ALTERATIONS
COVER WITH WALLBOARD AS HERE SHOWN. NOTE DIRECTION OF OVERLAPS. SIDES OVERLAP BACK, FRONT OVERLAPS SIDES
WALLBOARD
TABLE
PAINT TO MATCH SETTING OR STAIN DARK BROWN IN IMITATION OF OLD OAK
PAGE KIRK

into one piece 38 in. by 6 ft. for back. One piece 20 in. by 6 ft., for front of back (B). One piece 18 in. by 4 ft., for front seat (B). Two pieces 18 in. by 38 ft., for ends. One piece 3½ by 3½ ft., for seat (9).

Unless an exceptionally finished bench is wanted, wall board for the seat is unnecessary.

Wood: One board 2 by 3 in. by 10 ft., cut into two 37-in. and two 18-in. lengths, for back and ends. Two boards 1 by

3 in. by 10 ft., cut into two 37-in., four 18-in., and four 17-in. lengths, for back, seat braces, and front. One board 1 by 2 in. by 12 ft., cut into three 24-in. and four 18-in. lengths, for bracing. One board 1 by 12 in. by 10 ft., cut into two 5-ft. lengths, for seat. One board 1 by 14 in. by 5 ft., for curved pieces at top of back and bottom of front. Six blocks about 3 by 4 in., for braces.

2 pc.	2 by 3 by 37 in.	Lower Uprights, back (1)
4 pc.	1 by 3 by 17 in.	Lower Uprights, front (2)
2 pc.	2 by 3 by 18 in.	Lower Cross Pieces, end (A)
2 pc.	1 by 2 by 18 in.	Braces, inside (4)
4 pc.	1 by 3 by 18 in.	Cross Pieces, seat supports (6)
2 pc.	1 by 3 by 37 in.	Uprights, back (5)
3 pc.	1 by 2 by 24 in.	Braces, lower (7)
2 pc.	1 by 2 by 18 in.	Braces, lower (8)
2 pc.	1 by 12 by 56 in.	Seat
1 pc.	1 by 14 by 56 in.	Top Rail (10) and base of Front (11)
6 pc.	Scrap, 3 by 4 in.	Braces (12)

Construction. (See also Fig. 4.) Any scrap lumber of the required length may be used for bracing. Make full-sized drawing of ½ of decorative curve on end. Fold drawing on center line and cut along curve. Open out and use as a template with which to draw curve on wall board. Saw before nailing wall board to frame of seat.

Where there is an overlap of wall board, add ¼ in. to the dimensions of the overlapping piece. Attach wall board to frame with standard wall-board nails, the heads will be hidden by the paint. While not necessary, slating braces across the back add greatly to the strength of the framing.

Paint to represent stone or to match back curtain.

This bench may be varied by changing the height of the back as shown in the drawings. However, for general use, it is best as dimensioned, since it is high enough for an actor to lean over from behind, with comfort and visibility.

A pair of such benches may be placed one on either side of the stage, or they may be joined to make a semicircle.

Bench and Table

Bill of Material

Bench: One board 1 by 15 in. by 4 ft., for top. One board 1 by 12 by 34 in., cut into two 17-in. lengths, for ends B. One board 1 by 6 by 41 in., for shelf C. One board 1 by 1 in. by 5 ft., cut into four 1-ft. lengths, for cleats under top D, and two 6-in. lengths, for cleats under shelf E.

Table: One board 1¼ by 10 in. by 15 ft. cut into three 5-ft. lengths, for top. One board 1 by 10 in. by 10 ft. cut into four 28¾-in. lengths, for ends A. One board 1 by 6 by 46 in., for shelf D. One board 2 by 4 in. by 8 ft., cut into four 2 ft. lengths, for feet of table E. One board 1 by 3 in. by 10 ft. cut into two 46-in. and two 18-in. lengths, for framing around top B and C.

4 pc. 1 by 10 by 28¾ in.	Ends A
3 pc. 1¼ by 10 by 60 in.	Top
1 pc. 1 by 6 by 46 in.	Shelf D
4 pc. 2 by 4 by 24 in.	Feet E
2 pc. 1 by 3 by 46 in.	Framing around Top B
2 pc. 1 by 3 by 18 in.	Framing around Top C

Construction. Draw one half of curved end, fold on center line and cut on outline; use as template to transfer designs to wood. The framing under the top of the table is necessary for strength. Cleats should be glued and screwed. Paint to match curtain or stain a very dark brown to give the effect of old oak.

If well made of good wood and stained walnut, this bench and table are excellent for the school library or a clubroom. When so used, and borrowed for the stage, it solves the ever-present problem of storage for stage properties. In other words, this bench and table may well be made to serve a dual purpose.

Dresser

Bill of Material

Wall board: One piece 4 by 10 ft. and one 4 by 8 ft., cut into one piece 38 in. by 7 ft., for back of AA. One piece 8 by 38 in., for decorative trim at top, AA. One piece 37 by 35 in., for front of BB. Two pieces 18 in. by 6 ft. 11 in., for sides of AA.

(If BB is to be used separately, either as a bureau or as a fireplace, with sides covered, extra wall board will be necessary, as the scraps left are all too narrow. If used as a bureau, cover outside; if used as a fireplace, cover inside.)

Wood: One board 1 by 12 by 42 in., for top of AA. One board 1 by 10 in. by 15 ft., cut into two 6 ft. 11 in. and one 36-in. length, for sides and wide shelf of AA. Four boards 1 by 8 in. by 12 ft., cut into two 35-in. lengths, for top of bureau M. Four 34-in. lengths, for sides of bureau N. Two 33-in. lengths, for bottom of bureau P. Two 42-in. lengths, for sides of AA, D. Four 36-in. lengths, for shelves of AA, E, and C. One board 1 by 4 by 6 ft., cut into two 36-in. lengths, for back of shelf and lower back brace to AA, F, and G. One board 1 by 2 in. by 12 ft., cut into two 16-in. lengths for bottom side braces to bureau S. Two 10¼ in. lengths, for top of AA, J. One 40-in. length, for top of AA, H. One 36-in. length, for top inside brace of AA, K. One board 1 by 1 in. by 4 ft., cut into six 8-in. lengths, for shelf blocks of AA, L.

AA, Shelves

1 pc.	1 by 12 by 42 in.	Top of AA
1 pc.	1 by 10 by 36 in.	Wide Shelf C
2 pc.	1 by 10 by 83 in.	Sides D
2 pc.	1 by 8 by 42 in.	Sides D
4 pc.	1 by 8 by 36 in.	Shelves E and C
2 pc.	1 by 4 by 36 in.	Back of Shelf F Lower Brace G
2 pc.	1 by 2 by 10¼ in.	Top, sides, J
1 pc.	1 by 2 by 40 in.	Top, front, H
1 pc.	1 by 2 by 36 in.	Top, inside brace, K
6 pc.	1 by 1 by 8 in.	Shelf blocks L

BB, Bureau

2 pc.	1 by 8 by 35 in.	Top M
4 pc.	1 by 8 by 34 in.	Sides N
2 pc.	1 by 8 by 33 in.	Bottom P
2 pc.	1 by 3 by 33 in.	Top Framing Q
2 pc.	1 by 3 by 14 in.	Top Framing R
2 pc.	1 by 2 by 16 in.	Bottom Bracing S

Construction. AA. Draw ½ decorative trim at top, fold on center line, cut and trace on wall board. Trim may be omitted, but it adds to the appearance. The curve on side D should be drawn directly on wood, sawed, and second side traced from first. The entire side may be made 12 in. wide and this curve omitted, but a wider base gives better balance. May be used separately as shelves, with or without curtain at lower half.

BB. Construct frame and cover with wall board. If sides are not visible, they may be left uncovered; if visible, cover as directed above. On our own stage, back of BB is left open, sides covered and entire interior painted black. Front to audience, it is furniture; reversed and slid into opening of mantel, it becomes inside of fireplace. Used separately, it is a bureau or chest of drawers.

(To be continued)

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We cannot develop a program of vocational education out of thin air. We must have opportunities for tryout and guidance before a vocational choice is made, and before intensive vocational work is undertaken. The need for vocational education is self-evident.—*F. T. Struck.*

A Defense of the Textbook

*Homer J. Smith**

THE present discussion assumes the value of books for specific learning and for general growth. We live in an age of *print*, and American education, beyond that of other nations, stresses reading as a basic plan with constantly increasing requirement. For both informal and organized development we place great confidence in books and our people appreciate their worth. Reading has become a popular interest, an accepted method of preparation, and the foundation of social intercourse and control. *We emphasize the necessity of books.*

It is assumed, secondly, that instruction is enhanced by the use of several works upon a given subject, with their varying viewpoints and manners of approach. While our schools lead the world in devotion to the textbook method, yet we make intensive use of the ideal of supplementation. There are few subjects or levels in general education still failing of adaptation to our dual plan — that of a basic text for the core of content with additional and complementary readers, guides, and workbooks. *We extol both the text and the reference.*

(To the writer, a textbook is a volume selected in keeping with the nature and aim of a student group and possessed by each member for the duration of the course.)

But Industrial Education, while making much use of the reference, does not match other school fields and departments in common use of the text. For several reasons, a few of them good, we seem to feel that our subjects do not lend themselves in standard fashion to the usual means of teaching.

We have trade schools, with valuable reference libraries, wherein the textbook is not employed; wherein it is not only scorned, but ridiculed and disparaged. We have hundreds of school systems wherein industrial-arts teachers conduct their work year after year with complete disregard of the text. We have hundreds of evening and part-time organizations where texts are excluded because of brief school contact, which circumstance should be their truest justification. This neglect of a valuable professional tool has not all come of ignorance or indifference. It has come from a blind following of false prophets; from an eager and passive acceptance of the theory that our work must be "different" and that established procedures must be forsaken. Leadership responsibility for deplorable trends need not be definitely placed but we may hope that those who have erred will live to do what they can in counteraction.

*Professor of Industrial Education, University of Minnesota, Minneapolis, Minn.

There is evidence of a recent increasing use of books — references and texts alike. Younger teachers through the influence of long residence in the training centers may be expected to "leaven the lump" and to "turn the tide." As certification requirements increase, no clearer trend of improvement in our field will be noted than the common use of a basic book as the body and chart of each course. The few years just ahead will witness a similar acceptance of numerous techniques and devices proved in older fields. We have begun the "back trail"; we are becoming more *like* rather than unlike our academic colleagues. It is because of this belief that I have chosen to defend the text and to urge its consistent use with industrial classes. Any course — shop, related, or academic — in any school unit or level — under any condition or aim — would seem to be subject to better presentation *with* a text than without it. *Even a fair textbook is better than none.*

Aside from precedent, and yet as a part of it, the chief objection to textbooks is that informational effort reduces the project and production work that can be attempted. There is no worthy reply to this statement when it is advanced by an administrator of the old school or by a teacher who has lapsed in professional interest. Unless one's opponent will admit a greater need of information than of skill in the industrial arts and trade training of this day, it is utter waste to argue for the textbook. Similarly useless effort is expended in combating the beliefs that such books are used infrequently, that no physical provision has been made for group work, that texts sometimes contain incorrect or obsolete matter, and that they are easily soiled in the shops. There are those who sadly mention the cost, only to be reminded that their schools provide each student a score of tools of greater cost and of lesser comparative value in education.

Some bemoan the fact that the typical shop student is not interested in books and that he reads with difficulty. This indictment cannot erase a teacher's responsibility to help each pupil to increase his vocabulary, to improve his reading, and thus to gain independent study habits so useful in after life. The industrial teacher has few duties more compelling than the building of interest in self-improvement and the providing of means for upgrading.

It has been suggested that a book does not save a teacher's time; that there is greater economy in the lecture method. Those who hold this view have yet to learn that seeing is more effective than hearing; that the printed page or chapter is better worked than the

half-hour talk; that the illustrations afforded tend to surpass sporadic blackboard sketching; and that notes hurriedly taken by students are less helpful than the book for second reading.

We have heard it said that shop students oppose the use of texts and resent all home assignments; that they elect our courses in an effort to escape; that one cannot be certain that they will do the reading required. There is no answer, save that the little boy or the full-grown man may not know what is best for him and that the trained teacher may be trusted to prescribe and to administer, with all possible tact, as long as these twain shall meet. A truly professional man does not ask his clients how he shall treat them.

Other common assertions are that good books are scarce; that many are poorly organized; that some fail to match a teacher's plan or the school and community need. It is urged that books often contain more material than is necessary; that they inhibit one's method of teaching; and lessen pupil confidence in an instructor's ability. All such contentions suggest that some instructors have unwarranted pride in their powers. The industrial teacher, with training and experience however complete, is not in a position to deny his students the help to be had from others of differing background. Very often a class or school needs to be saved from such a teacher, in a manner the textbook provides. Left to his own devices he will, in all earnestness, teach the little that he knows under organization and with methods that he knows not of.

Despite constant improvement, it must be admitted that the making of texts in our field has not reached the perfection attained in most others. Grade placement is not exact; the pupil's viewpoint is not well exemplified; directions are often vague or scant; the project casts a shadow on the problem; and progression is obscure. Nevertheless our authors are of broad experience and studious; their work has usually profited from trial with classes as well as from checking by editors. A body of content so developed and presented undoubtedly constitutes a better course than can be provided by the average teacher.

Texts need not be used in their exact order nor in their entirety; they must be given supplement of local kind; they must not be permitted to narrow courses nor to deny students a broad enrichment. They form a core of useful material which serves as a chain to bind a class together and as a means of individual discipline. They guarantee certain items mastered by all, a body of information compact and convenient for review, assignments easily made, and grading better done. They serve to develop interest, to indicate the direction and the fullness of courses, and to afford appreciation of progress. They offer a certain amount of subject uniformity; they are appreciated by general administrators; they lend dignity to a field already acceptable, but still striving for full fellowship.

Discussion of the evaluation, selection, and methods of using textbooks has no place in this limited writing. Each of these is a phase sufficiently comprehensive to warrant extended treatment in longer articles or as chapters in professional methods books. We have attempted here to crowd into brief space what may appear to be a fair and logical statement of a defensible proposition. It is not suggested that teachers forsake the methods to which they are accustomed, but that they give due consideration to the true and present worth of these methods. It is urged that all courses proceed with more informational emphasis, that the materials of each course be better selected and organized, and that the main points in the path of progress through each course be definitely charted by use of a text.

Let us choose the best book available for each group and place it in the hands of each student; let us then indicate definitely the pupil's textbook responsibility; let us supplement the book with lectures, references, demonstrations, and individual help. This plan may be expected to prove its value in heightened interest and in better work, even better physical product. *There is nothing about our special field that precludes the use of books; there is much about it that necessitates their use; there are singular reasons for adoption of the basic text.*

Junior Mechanics[1]

Woodworking Standards

*P. L. Cressman**

THE article on "Junior Mechanics" which appeared in the March, 1932, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, shows that this program was designed primarily to motivate all types of industrial-arts work in the junior high school. To this end, standards are set up for the completion of work in each industrial-arts unit. This article describes those set up for woodworking.

The 3 by 5-in. card containing the standards is retained by the student. As he completes each of the 10 standards, the instructor puts his O.K. in the space

[1]This material is taken in part from the *Junior Mechanics Hand Book* (1931), by P. L. Cressman.

*Department of Public Instruction, Harrisburg, Pa.

Name _____ Address _____ Club _____

JUNIOR MECHANICS

WOODWORKING

I hereby certify that the above named Junior Mechanic has satisfactorily completed the work listed in accordance with the standards set forth in the Junior Mechanics Hand Books.

	Approved		Approved
1. Sketch project		6. Sharpen edge tool	
2. Prepare bill of material		7. Operate and care for oilstone grinder	
3. Use judgment in selection of material		8. Do a practical job	
4. Construct project		9. Practice safety precautions	
5. Properly use and care for tools		10. Secure occupational information	

Approved for degree of Master Junior Mechanic _____

Club Leader

provided. The unit for woodworking may be earned for work done during the industrial-arts shop period.

It should be kept in mind that the standards appearing on the card were rather arbitrarily set up at first. They have since been subjected to careful and critical review by groups of shop teachers. These standards, however, should not be regarded as final, and suggestions for improving them will be gratefully received.

Guideposts for Setting up Standards

In setting up the standards for each unit, the following questions were asked. Are they proper and suitable from the standpoint of:

1. The educational philosophy as it applies to the junior high school?
2. The industrial-arts education philosophy?
3. Exploratory experience—Sampling vocations?
4. The consumer's appreciation?
5. The boy?

The Hand Book

Part I of the *Junior Mechanics Hand Book* outlines the organization of the Club. Part II is devoted to amplifying these standards as set up on the 3 by 5-in. cards. The following additional information and instruction is given to the junior mechanic regarding the standards in woodworking in the *Hand Book:*

1. *Sketch Project.* The purpose of making the sketch is to assure the instructor that the junior mechanic has a true conception of the project he wishes to make. The sketch should provide for desirable design, proper proportion, and proper construction. The sketch should be done sufficiently well that another junior mechanic could read it without requiring verbal explanation. The sketch should not, however, be regarded as a test in mechanical drawing.

2. *Prepare Bill of Material.* Lumber dimensions should be given in the following order: 1. Thickness, T; 2. Width, W; 3. Length, L.

No. of Pcs.	*T*	*W*	*L*	*Bd. Ft.*	*Stock*
1	1"	6"	2'	1	W.P.—S2S

W.P.—S2S = White pine surfaced on 2 sides.

A bill of material should include all the lumber required, preferably worked out in detail. It should also include the hardware needed and a statement requiring the finishing materials to be used.

3. *Use Judgment in Selection of Material.* Judgment in selection of material should be considered from several angles. First, for what will the project be used? Must hard wood be used, or may soft wood be used? What finish will be required to properly fit the project into its surroundings? What kind of wood will be best adapted for this finish? What hardware will be needed—design, strength, finish, etc.?

4. *Build Project.* The standard set up is that each junior mechanic construct at least one project which is within his range of ability and one sufficiently difficult to challenge him to put forth his best efforts. The standard is based upon the individual student's ability and interests which will call forth the best quality of workmanship possible. Secure the maximum of craftsmanship possible, giving due and sympathetic consideration to youth struggling with a problem. Careless work should not be tolerated. On the other hand, skills as ends in themselves should not be regarded as primary objectives in industrial arts in junior high schools.

Extent of growth and improvement should be rewarded possibly to a greater degree than accomplishment only. Provide for individual differences. This standard must thus of necessity remain flexible. Have the junior mechanics realize the necessity that when they undertake a project they must complete it in a satisfactory manner. We must be concerned about the attitudes and habits our students develop.

The standards set up in junior mechanics do not specify the type of construction that should be mastered. The construction will be determined by the type and use of the project.

Somewhere in his woodworking course, the junior mechanic should have been taught how to square a board, join with nails, screws, make simple joints, and how to prepare for finishing.

The projects should challenge the lads' interests. They should be considered useful by the junior mechanics. They should inherently require skill. A few suggested projects are wagon, sled, reel, model airplane or boat, creeper, Christmas-tree stand, lamp, chair, workbench, tool cabinet, arbor, trellis, bird house, chest, cabinet stand, etc.

5. *Proper Use and Care of Tools.* Junior mechanics must use tools correctly, that is, in a manner that is approved by good mechanics. When the plane is not in use, it should lie on its side or set on shavings, etc. Tools need care to protect cutting edges, avoid breakage and prevent rusting. Develop right habits in these and similar points. (Instruction will be given by the instructor.)

6. *Sharpen Edge Tools.* It is considered advisable that each junior mechanic sharpen properly at least one edge tool, such as a chisel or a plane bit. This will include grinding on an oilstone grinder, removing wire edge and putting a good cutting edge on the tool. Shop

instructors may well insist on an even higher standard such as requiring the student to always keep cutting edge tools in this condition.

The sharpening of a saw is too high a requirement for junior-high-school industrial-arts students.

7. *Operate and Care for Oilstone Grinder.* Detailed instruction as how to operate this machine will be given by the instructor. Be sure to keep bearings oiled. Avoid cutting grooves into the stone, etc. The students should feel a responsibility for the oiling and care of this machine, and any other machine which they are permitted to operate.

8. *Do Practical Repair Job.* Each junior mechanic should do a practical repair job at home or at school. Repairing furniture, hanging a screen door, putting new netting on a screen door, etc., would meet this requirement. If the instructor cannot arrange to see all these repair jobs at home, then father, mother, or neighbor mechanic may pass upon the work and certify to the work done in a report to the school.

9. *Practice Safety Precautions.* Shop safety instruction should be provided for each worker at the bench, such as how to hold his chisel when chiseling or position of hands when sawing, etc.

Safety instruction should be provided by the instructor to each operator and observer of the woodworking machinery used in the school shop. Proper methods of operating, position of operator, his hands, clothing, use of goggles, and particularly dangerous risks should be pointed out. Instructors will add other safety instruction to this brief list. Additional instructions are provided for in the *Hand Book* under the general topic "Safety Precautions."

10. *Secure Occupational Information.* Each junior mechanic should secure, with the help of the instructor, information regarding the woodworking trades and allied trades. He should be prepared to answer the six following questions which are asked in the "Club Ceremonies" usually put on during the club period:

1. What is the nature of the work?
   (A brief occupational analysis.)
2. What are the advantages and disadvantages?
   (Interest, strain, promotional opportunities, etc.)
3. What training and qualifications are necessary?
   (General and specific.)
4. What are the periods of work?
   (Hours per day, seasonal, fluctuation, etc.)
5. What are the remunerations?
   (Salaries, satisfaction, and otherwise.)
6. What are some of the allied trades?

Additional instructions as to how the information is to be secured is given in the *Hand Book* under the topic of "Information Regarding Vocations."

Test: If the junior mechanic has fulfilled all the requirements herein set forth for woodworking, he may become an applicant for the master degree in woodworking.

Model Power-Boat Racing

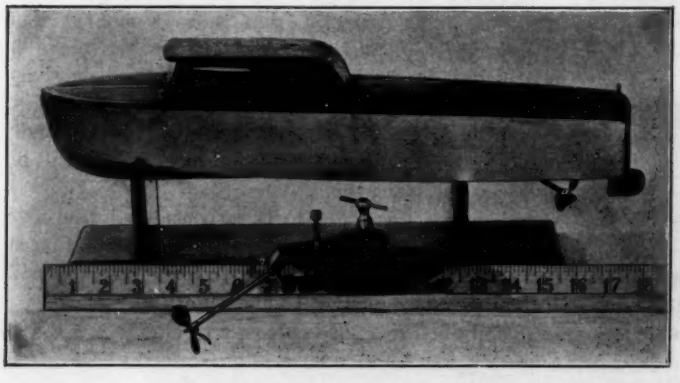
*J. S. Turnbull**

THE sport of model power-boat racing has attained considerable interest in the past few years due to the fact that several manufacturers have designed spring and electric motors which are suitable for the propulsion of model boats. Previously, the only means of power was rubber bands or old discarded clocks.

These motors have created a desire for the boys to make high-speed model boats to enter in contests or to take with them on outings with mother and dad in the summer and during the winter months, place the model in their room or "den" as the pride of their achievement in the manual-training shop.

One of the outstanding events of 1931 in Seattle, Wash., was the Fifth Annual Regatta for model boats held under the auspices of the Seattle Public Schools, May 23, at Greenlake Bathing Beach. There were nearly 200 entries and several thousand people witnessed the contest. The models included all types produced in the manual-training classes of the city schools, and each was given an opportunity to perform in competition.

*James Monroe Junior High School, Seattle, Washington.



The races were divided into five classes: sail boats under 18 in.; sail boats between 18 and 24 in.; sail boats over 24 in.; power boats equipped with spring motors; power boats equipped with electric motors.

So many entries were received that each class had to be run off in heats, although some schools had held preliminary races to determine their best boats.

The most popular race and the one having the greatest number of entries was the

race of power boats equipped with spring motors. It was won by Wilbert Salter of Coe School.

Wilbert claims that his success was attributed not only to perfect workmanship and finish on the model itself, but also his ability as an engineer. He carried a small pocket oil can and supplied a generous quantity of oil on the gears and spring of the motor just before the race. Besides this, he had filed the blades of his small bronze propeller down to a keen edge so that they could cut the water with less resistance, thus conserving the power of the motor for giving the boat greater speed.

One of the greatest problems in model power-boat building has been the difficulty in locating suitable plans to work from. An article by C. W. Horst in the December issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION shows an excellent power boat which is particularly suited for boat racing because it has a keel which will keep it on a steady course during the entire race.

Introductory Lesson in Sheet-Metal Work

*Alfred B. Grayshon**

Metal is responsible for much of our present method of modern life. It is necessary to aid agriculture, manufacture our clothes, provide transportation and communication, help cook our foods, furnish lights, build our buildings, cut our lumber, and harness swift streams of water. In fact, we must have it to provide us with necessities as well as luxuries.

There are numerous kinds of metals, such as iron, steel, aluminum, copper, brass, silver, gold, platinum, etc. In industry these are found in three general forms — sheet, bar, and castings. Sheet metal is used for cooking utensils, cans, pails, tanks, auto bodies, steam- and electric-car bodies, cornices, spouts, eaves, electric signs, watches, toys, and innumerable other articles.

The cheapest and most commonly used sheet metals are black iron, tin plate, and galvanized iron.

Black iron is sheet metal which may be obtained in various thicknesses.

Tin plate is sheet steel which has been cleaned with acid and dipped into melted tin. The tin coating which adheres to the steel, acts as a temporary protective coating.

Galvanized iron is sheet steel which has been cleaned with acid and then dipped into melted zinc to act as a more permanent coating.

The so-called *tin cans* which are obtained in the store are made, not of pure tin, but of *tin plate*. Such a can has temporary use as a container and is then discarded. The can rusts only when the tin plating has worn off through exposure to the weather or moisture.

Tin plate and galvanized iron are usually joined either with soldered seams or locked seams. The soldered joint will be considered first. A lap seam is the usual soldered joint. For a small job ⅛ in. is lapped, while a larger job has a ¼-in. lap. The materials needed are soldering copper, sal ammoniac block, flux, and soft solder. The soft solder used for this purpose is made of half tin and half lead. Tin will stick to any cleaned metal surfaces, while lead will not stick to anything, but the two metals when melted together make a soft, cheap alloy which may be used for the purpose of soldering two metals together.

The soldering copper, often called soldering iron, is made of copper because this metal heats quickly, cools slowly, and can be cleaned by chemicals without perceptible damage. Being a fairly soft metal it can very easily be reshaped by forging and filing, when that becomes necessary. The soldering copper is heated to a temperature that will melt solder (*never* heat it red-hot). It is then dressed off quickly with an old file, rubbed on the block of sal ammoniac, and applied to the solder. The solder, in melting, covers and adheres to the point. This operation is called "tinning the copper." The point will now pick up a drop of solder like a magnet picks up iron filings. Good soldering can only be accomplished if a cleanly tinned soldering copper is used. The fluxes, which aid soldering, may be divided into three main classes — killed acid (muratic acid killed with zinc), rosin, and soldering paste. For general purposes killed acid diluted with water is used. For tin half killed acid and half water will do. It is applied to the joint with a brush. Press down on the upper piece of tin, and apply a little solder with the tinned soldering copper to each end of the seam. This secures the seam. Then the rest of it may be soldered. Do not be too hasty. Remember that the soldering copper must heat the metals that are to be joined. Evidence of solder on the outside of the seam does not signify a good seam. Retain the pressure on the seam for a few seconds after the solder has been applied, to give it a chance to solidify.

A locked seam is composed of two single hems hooked together and locked with a grooving tool. This type of seam is used on cans, buckets, stovepipes, etc.

The following tools are also needed to work on the first project: A scale graduated into 64ths for measuring, scratch awl for marking, dividers for stepping off equal spaces, try-square for squaring the lines, tinners' shears or snips for cutting, mallet for closing folds, grooving tool for making a locked seam, hammer, and a square stake.

Exercise:

Take a piece of tin plate 3½ by 5 in. and divide it into 3 equal parts, with the dividers and scale. Scratch the lines across the metal with the scratch awl and try-square. Cut on the lines with the snips. Put a ⅛-in. double hem on one edge of one piece, and a ⅛-in. single hem on one edge of each of the three pieces. Hook the single hem on the double-hemmed piece to one of the single-hemmed pieces and lock the seam with a No. 6 grooving tool and hammer. Now lap the plain edges of two of the pieces ⅛ in. and proceed to make a soldered lap seam. Close down the two hemmed edges on the inside edge with a mallet, but do not flatten the hems. This completes the exercise of edging and seaming. This experience will demonstrate for you the correct method of making edges and seams on sheet-metal work.

References:

General Metal Work, by Grayshon, the Manual Arts Press, Peoria, Ill.

Sheet Metal Workers' Manual, by Broemel. The Frederick J. Drake & Co., Chicago, Ill.

*Olney High School, Philadelphia, Pa.

PROBLEMS & PROJECTS

BEDROOM ROCKER

Lyle M. Garnett, Milwaukee Vocational School, Milwaukee, Wisconsin

(See Supplement No. 238)

The bedroom rocker shown in the aforementioned supplement may be made of walnut, mahogany, birch, maple, gum, or oak with equal effectiveness. This is an excellent project for the advanced student, as certain joints are cut at angles other than 90 deg.

The front legs may be turned as the first operation after the mortises are cut for the front and side rails.

A template for the back leg should be made of heavy paper or thin wood. By carefully laying the template on the board, considerable material may be saved. It is a good idea to rough-saw the back legs; then nail the two pieces together with thin brads. Band-saw near the line this time and smooth off the edges with either a spokeshave or with a circular plane if one is available. The joints for the back legs may be laid out while the two pieces are nailed together. If this is done, the student may feel sure that he will get a right and left leg for his chair.

The rockers are marked from a template in the same manner as the back legs, and are nailed together and smoothed off in the same way.

A convenient way for the student to get the angles for the side rails is to make a full-sized layout of the plan of the rocker. He can then take off the angles from the plan with a T bevel.

The frame may be glued together without paying any attention to the dowel joints which hold the rockers to the legs of the chair. These joints may be cut later. After the framework is glued and dry, set the frame on the rockers and adjust backward and forward until the chair balances. Scribe the bottom cut on the edge of the leg and plane to the line. Locate the center of the leg and bore a ½-in. hole at that point for the dowel pin. Insert the dowels in place and set back on the rockers in such a way that the dowel projects over the face of the rocker. Scribe along the edge of the dowel. This will give the angle at which the dowel hole is to be bored into the rocker.

The seat frame may be doweled or mortised together just as the individual wishes. When the woodwork is completed, the desired finish should be applied before the seat cushion is made.

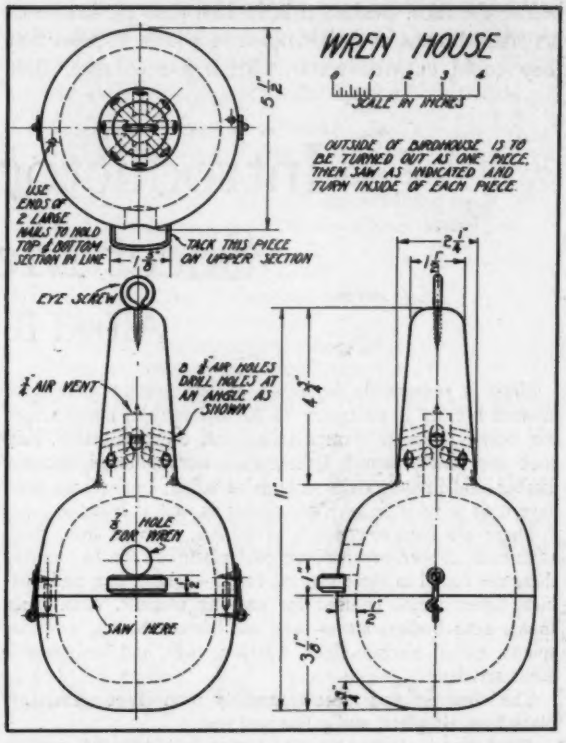
Preparatory to padding the seat, webbing should be stretched across the framework and securely tacked. This webbing should run both ways across the frame. A piece of heavy muslin should then be tacked over the web and moss laid on in an evenly crowned pad. A second piece of muslin should then be stretched rather tightly over the moss, and tacked down securely. The covering is then tacked over this and a piece of gimp used to hide the heads of the tacks along the edge of the cover. The student should be exceptionally careful not to leave hammer marks on the varnished surface.

THE GOURD WREN HOUSE

Ross C. Cramlet, Junior-Senior High School, Newton, Iowa

The bird house is a popular project among boys during the early spring. Often the school is asked to sponsor some kind of contest which will stimulate interest in practical bird houses of original design.

Many years ago the old-timers used to put up a boot, tin can, or occasionally a gourd with a hole cut in the side. This particular house is patterned after the latter idea. The gourd was usually hung in the grape arbor near the wall. However, the ingenious lad of today finds many convenient places for this home which the wren so readily accepts.


WREN HOUSE
SCALE IN INCHES
OUTSIDE OF BIRDHOUSE IS TO BE TURNED OUT AS ONE PIECE. THEN SAW AS INDICATED AND TURN INSIDE OF EACH PIECE
USE ENDS OF 2 LARGE NAILS TO HOLD TOP & BOTTOM SECTION IN LINE
TACK THIS PIECE ON UPPER SECTION
EYE SCREW
¼" AIR VENT
6 ¼" AIR HOLES DRILL HOLES AT AN ANGLE AS SHOWN
2" HOLE FOR WREN
SAW HERE

The directions for making this project are shown in the illustration. The finished project should be painted to look like a gourd.

FREE-HAND, THIRD-ANGLE PROJECTION FOR BEGINNERS IN MECHANICAL DRAWING

Jonathan Bright, Academy High School, Erie, Pennsylvania

(Continued from February. See Supplement No. 239)

Problem Sheet No. 5

This sheet consists of a series of completion problems given as a test of the efficiency of the instructor's teaching. They should show the instructor where his teaching has been weak and allow him to correct his errors. Care has been taken to involve only those principles which have been taught in the preceding four problem sheets.

Problem Sheet No. 6

This sheet teaches another line convention — center lines. Teach the proper weight and representation of center lines and the various methods of laying out large and small circles without the use of instruments. Teach the order of laying out the lines of an object requiring center lines. Teach that a cylindrical object or a round hole appears as a rectangle when drawn in the plane parallel with the axis of the cylinder or hole.

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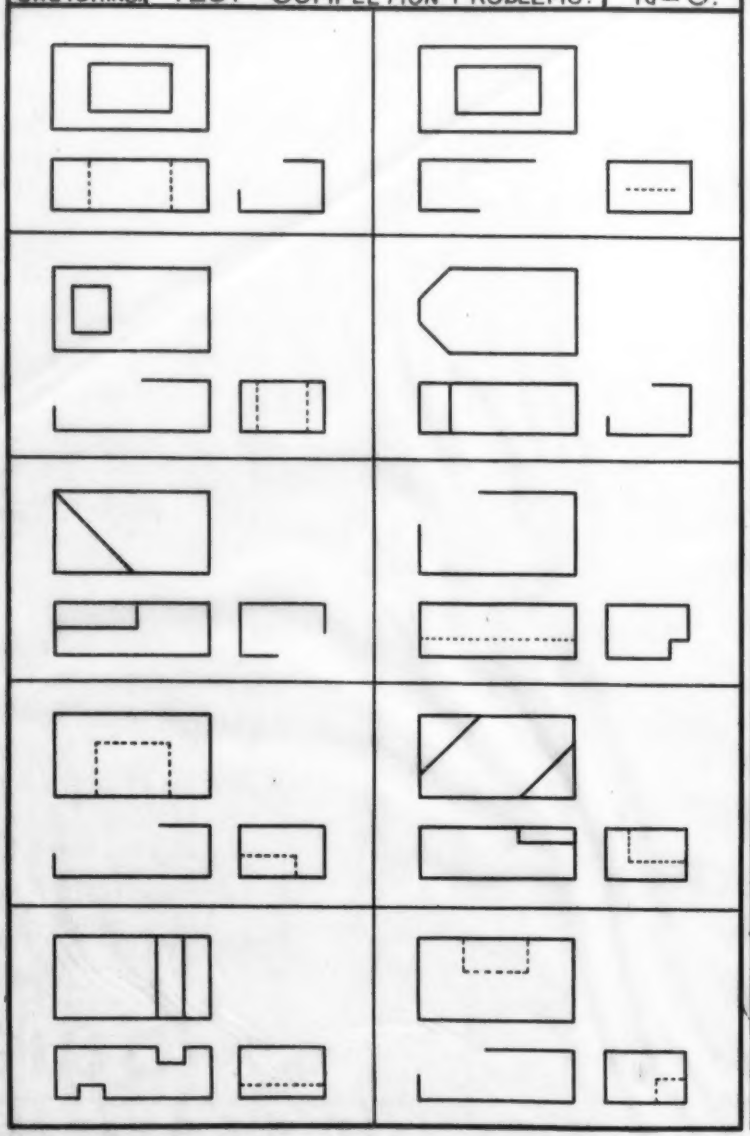
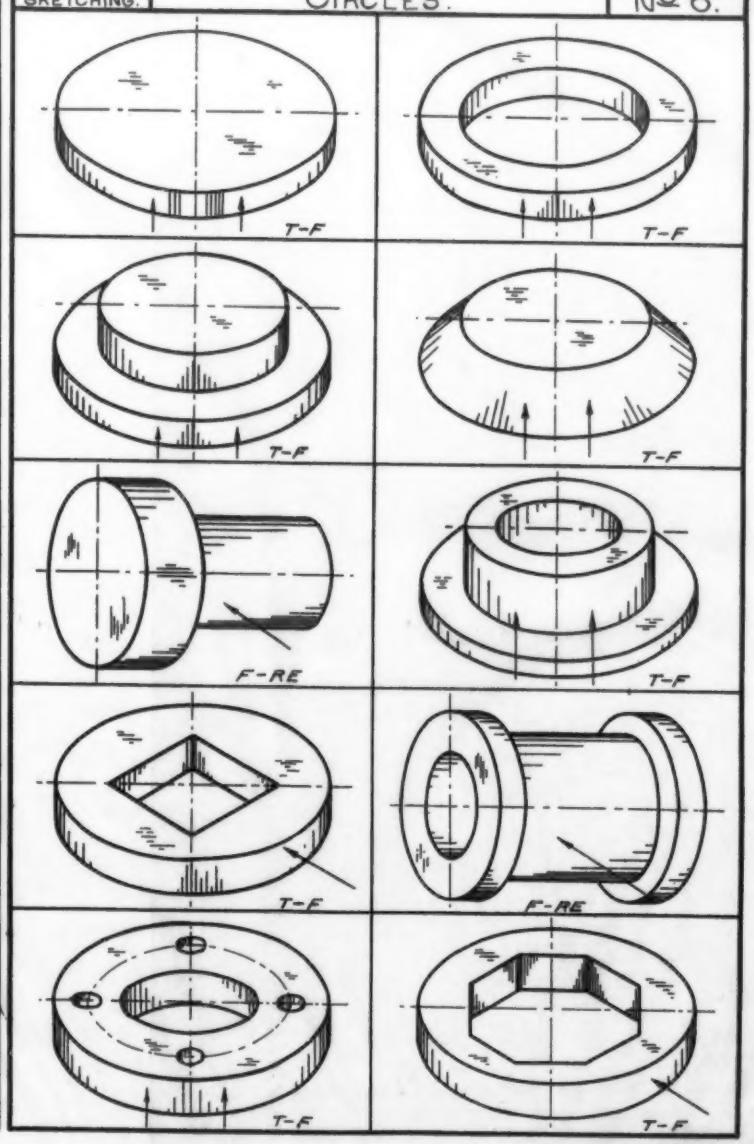
FREEHAND SKETCHING. TEST—COMPLETION PROBLEMS. No 5.



FREEHAND SKETCHING. CIRCLES. No 6.



Submitted by Jonathan Bright, Erie, Pa.

Described Elsewhere in This Issue

TRACING SUPPLEMENT No. 238, APRIL, 1932
INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

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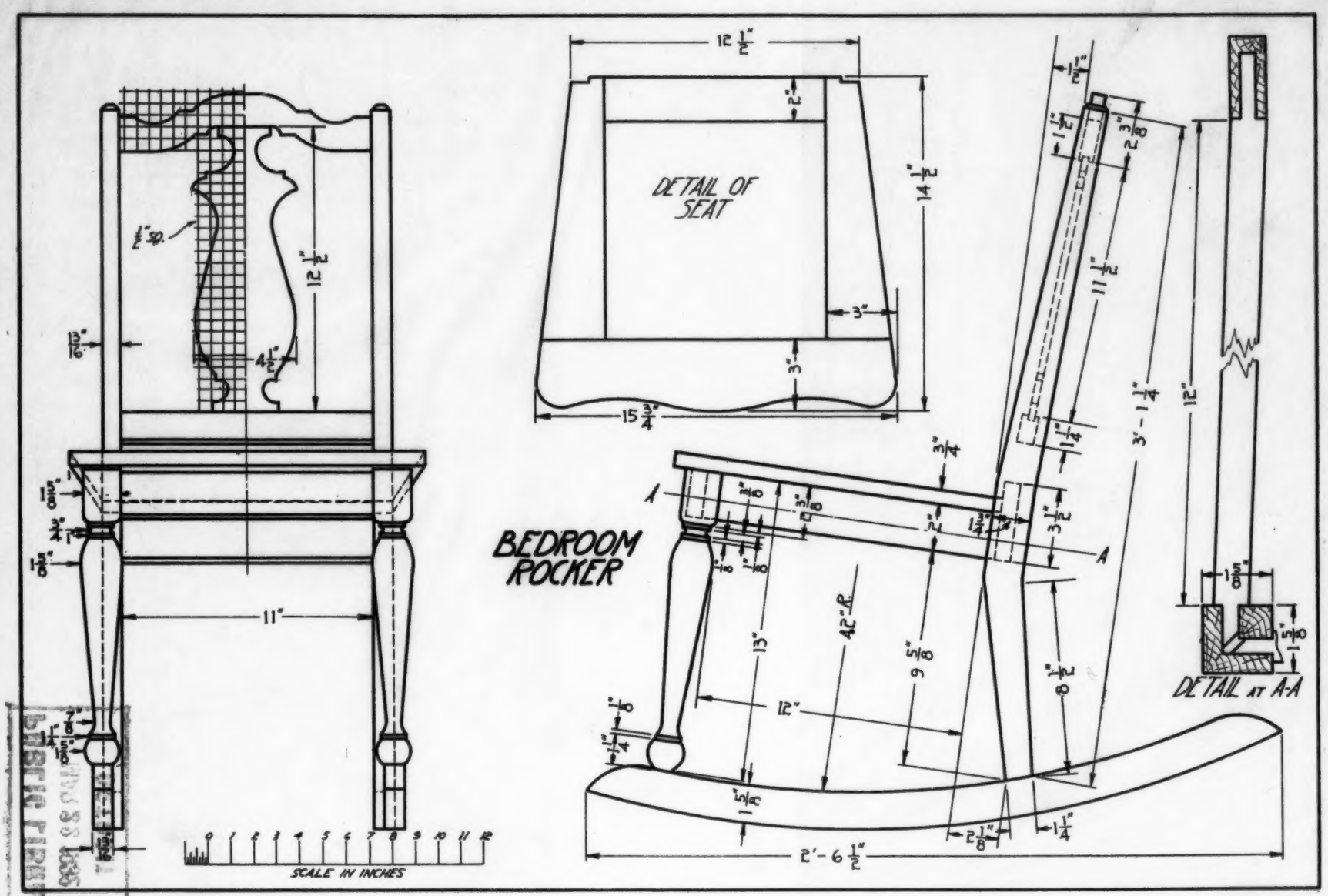
BEDROOM ROCKER



Designed by Lyle M. Garnett, Milwaukee, Wis.

Described Elsewhere in This Issue

SAFETY INSTRUCTIONS

Band Saw

This machine is dangerous unless you observe the following:

1. Never talk to the operator of the machine.
2. Remain at least two feet from the saw table when someone else is operating it.
3. Small chips should be removed from the saw only after it has stopped, or by using a stick to push them away.
4. Do not jerk the saw out of a cut. Draw backward as slowly as you push forward while cutting.
5. Do not do any sawing after the power has been shut off.

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Submitted by Lyle M. Garnett, Milwaukee, Wis.

CARRYING MOLTEN METAL

The boy in the above picture tried to carry a pot of molten metal with a stick. The pot slipped off and the boy's legs were burnt severely.

Use a stiff wire or an iron hook to carry the hot melting pot.

© Industrial Arts and Vocational Education.

Submitted by Jos. J. Lukowitz, Milwaukee, Wis.

SHEET-METAL BOOK ENDS OF PEWTER

E. W. Manzer, Supervisor Industrial Arts, Bronxville, New York

Good book ends have been, are now, and always will be popular projects for the personal use of students or as gifts to parents or relatives. The value of this type of project, however, lies in the quality of work done on the project and the quality of the design. Good-looking items will always find a permanent place in the home and thus they are quite welcome. If, on the other hand, the item does not have the qualities that go to make up an attractive project, it will not be long before the project will be consigned to the ash barrel.

"THE SOLDERING BENCH," BRONXVILLE PEWTER CRAFT SHOP, BRONXVILLE, N. Y.

It is quite as easy to produce good-looking projects in sheet metal as it is to produce inferior projects. If one has a bulletin board filled with good suggestions on projects that are well designed, the student will have some means of comparing good and inferior designs.

Pewter,[1] as a workable medium for sheet-metal projects, is rapidly gaining ground in many schools. It gives boys and girls an opportunity to work with a metal that responds more readily to the immature hand dexterity than any other metal. Soldering pewter is comparatively easy after several practice pieces have been tried. The melting point of pewter is about 450 deg., so it is quite imperative that soft solder is used. A good grade of 70-30 solder of the "no-sput" type is considered good. For jobs where there are to be two solderings on the same piece, it is advisable to use 50-50 solder for the first job and follow with 70-30 for the second job.

References for Required Readings

Technical Information:

Metalcraft and Jewelry, Kronquist. Chapter IX, Hammered Work, pp. 124 to 126; Chapter II, Pierced Work, pp. 20 to 24. The Manual Arts Press, Peoria, Ill.

Related Information:

Pewter Design and Construction, Varnum. Chapter XIII, Surface Enrichment of Pewter. The Bruce Publishing Company, Milwaukee, Wis.

Metal Work and Etching, Adams. Book Ends, pp. 7 to 13. Popular Mechanics Press, Chicago, Ill.

"Until recently a design was called good if it looked pretty on paper or if it were well drawn, and the question of the use and the construction seldom entering into the consideration of the problem. Nowadays, while good drawing is a requisite, the standards by which a design is judged are:

"1. Is it suited for the use and purpose for which it is designed?

"2. Can it be made in the manner designed and of the material indicated in the design?

"3. Is the indicated construction sound, and will the article be durable if constructed in this manner?

"4. Is it a suitable article for decoration?

"5. Is the decoration based on the structural elements of the design?

"6. Has the decoration been conventionalized to conform to the limitations and requirements of the tools and processes?"

From *Art Metalwork,* by Arthur F. Payne. The Manual Arts Press, Peoria, Ill.

INSTRUCTION SHEET FOR BOOK ENDS

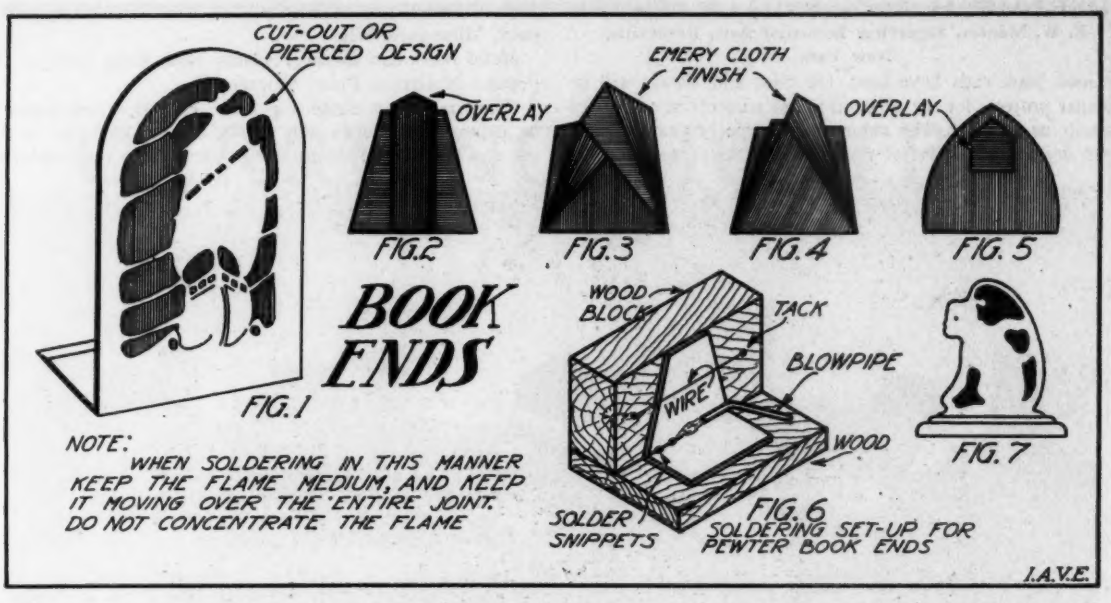
Procedure:

1. Draw 5 small original sketches of book ends and submit them for approval. Straight-line contour enrichment, such as are shown in Figures 2, 3, and 4, may be drawn if more difficult drawings such as the ship cannot be made.

2. Remember that the book ends must be serviceable when they are completed. What proportion will you use? How can one determine what size will be good for practicable book ends?

3. Make a full-scale drawing of the accepted small sketch. Use cross-section paper, draw straight lines with a rule or triangles, and curved lines with irregular curves. Have your full-scale drawing O.K'd.

[1]Information as to where pewter, solder, etc., may be obtained, will be furnished on request.



4. Cut metal (bronze, copper, or pewter) large enough to accommodate the full-scale drawing you have made. Be sure to include metal for the base of the book ends. Weigh and charge metal on material card. *Do this now.* If pewter book ends are to be made, the bases may be cut separately, because they will be soldered to the uprights after all work has been done (see Fig. 6). All other book ends will have the base bent in the jaws of a large vise.

5. To trace the design on metal, paint the surface of the metal with show-card white water paint. When dry, transfer the design with carbon paper. This is only for elaborate designs. Straight-line work can be laid out on the metal with a straightedge and scriber. For cut-out designs, clamp both pieces of metal together, putting a piece of oiled paper between to lubricate the fine metal-cutting saw blade. Drill small holes in each cut-out section to admit the saw blade. (See references for sawing process.) Straight-line edges may be cut with snips or the squaring shears.

6. Smooth all edges with a fine file and finish with fine emery cloth. If all piercing or sawing has been done, bend to shape in a wide vise with protected jaws. If pewter book ends are being made, see instructions shown in Figure 6.

7. If your design calls for an overlay of some other metal, such as is shown in Figure 2 and 5, cut out the overlay form. Clean both sides thoroughly and lay the best face or side of the metal down on a thick sheet of iron or on a plate from an old cook stove. Play a large Bunsen flame under the iron plate which is held up by a tripod. *Keep the flame moving* over the entire surface of the metal plate so that no one spot will become overheated. This is important for good soldering. When the overlay piece gets hot, apply soldering flux, and touch the metal with a solder of low melting point. A 70-30 or 60-40 solder is good for pewter. A commercial rosin core solder will be satisfactory for other metals.

Caution: Do not use too much solder. Place it nearer the outside edge of the overlay pieces, so that the solder will run along the edges of the piece that is being soldered or "sweated on," as this process is called.

8. When the solder, on the back of the overlay piece, has hardened, it is ready to be soldered or "sweated on" to the face of the book end. Clean the book-end face thoroughly with fine steel wool and fine emery cloth. Mark the exact position of the overlay piece. You are now ready for a good soldering job.

9. Place the book end, face up, on the iron plate. Lay the overlay piece on the face of the book end with the solder side toward the book end and in its right position. Place flux around the edges of the piece that is to be soldered on. Next, play the Bunsen flame under the iron plate keeping the flame moving over the entire surface so that no part of the plate will become overheated. When the solder between the two parts melts, it will show at the edges of the overlay piece. Watch carefully and when this appears, press down with a block of wood so that all parts of the metal will be soldered to the book-end surface. Let the metal cool. Wash off all flux preparatory to the application of the finish.

EXAMPLE OF OVERLAY WORK

10. If the design calls for a plain surface, use fine, old emery cloth and steel wool. Rub hard to produce a good finish. Clean with brass or silver polish. Heat slightly and wax with a good furniture wax.

11. To produce the modernistic finish, use new emery cloth and a straightedge and rub the metal in the direction that is called for by the design. See Figures 3 and 4. (Test pieces will aid one in getting good results.)

12. Wash and dry thoroughly. Heat slightly and rub with wax.

13. Evaluate your work. How could you improve this job if you were to do it again?

14. Have some member look at your job and offer his criticisms or commendations.

15. Submit finished project to instructor.

If you have not done all of the required reading for this project you have missed some important information that pertains to your craftwork. Are you going to lag along or be up-to-date?

PEWTER CRAFT ARTICLES MADE BY JUNIOR-HIGH-SCHOOL BOYS AND GIRLS, BRONXVILLE, N. Y.

LOCKING UP A FORM FOR THE PLATEN PRESS

Harry P. Bohrer, Monroe Junior-Senior High School, Rochester, N. Y.

The lesson presented herewith is useful in teaching a group of boys how to lock up a job for the platen press. It is used once each semester at the Monroe Junior-Senior High School and has never failed to bring the desired results.

The following standards for measuring questions were adhered to in the preparation of this lesson:

1. A question should be formulated in clear and forceful English.

2. Every question should be as short as possible to make it intelligible.

3. A question must be within the grasp of the learner, but not easily answered.

4. A question should be of such a nature as to admit of but one interpretation.

5. The fewer questions asked in a given time the better.

6. In a good scheme of questioning, students should raise as well as discuss questions.

Teaching Unit. Locking up a job for the platen press. Unit to be presented to a group of boys who have never before locked up a job.

Materials. Chase, imposing table, bearers, composition, furniture, reglet, quoins, line gauge, mallet, and planer.

Preparation. First Idea—A Chase

1. Boys (showing them a chase), what is this I have in my hands?

2. Of what kind of material is this chase made?

3. For what is a chase used?

4. How large must a chase be?

5. How many of you have ever seen anybody lock up a form outside of this school? Where?

Second Idea—A Chase in Position for Lock-Up

1. Where must the chase be placed in locking up a form?

2. What are bearers?
3. Where is the composition placed?
4. What must be done with the blank space between the composition and the chase?
5. For what are the quoins used?
6. What must be done with the string that is around the composition?
7. For what is the mallet and planer used?

THIRD IDEA—Form Ready for Press

1. How can the printer tell when a form is locked tight enough?
2. Why is it necessary to test all forms?
3. When a letter or a line is loose, what must be done?
4. How can one check whether the form is O.K. for the press?

Presentation

FIRST POINT—Chase must be placed on stone correctly, and composition put in a certain position.

1. Why is it necessary to use a certain size of chase?
2. How does the printer know what size of chase to use?
3. How is the top and the bottom of a chase distinguished?
4. In what position must the chase be placed on the stone?
5. How is the composition placed in the chase?
6. What difference does it make where the composition is placed inside the chase?
7. Why is it necessary to measure?

SECOND POINT—Furniture and quoins must be laid to lock against solid ends of chase.

1. How wide must be the furniture that is to be used for this job?
2. What must be its length?
3. How can one see whether the furniture has been placed properly?
4. How can one see whether enough furniture has been placed?
5. Why is the furniture made of a certain kind of wood?
6. How many quoins must be used?
7. Why should the quoins be laid a certain way?
8. How close to the composition may the quoins be placed?
9. What would happen if quoins were placed against the chase?

THIRD POINT—Job must be planed and not locked too tight.

1. Why is it necessary to plane a job?
2. What will happen if the planer is struck too hard?
3. How can one see whether a job is locked tight enough?
4. What will happen if a job is locked too tight?
5. If a job is locked too tight, how must it be loosened?
6. After a job is locked and ready for the press, how must it be tested?

Application. Have one boy at a time lock up a job. This may be done in the following way:

"William, I have a job here for you to lock up. Get a chase and proceed. I'll watch you to see that you do it right, and the rest of you boys come closer to the imposing table and watch so that when your turn comes you will not make any mistakes."

Keep this up until satisfied that each boy can lock up a form properly.

Testing. To test whether the student can really do the job independently, the teacher may proceed as follows:

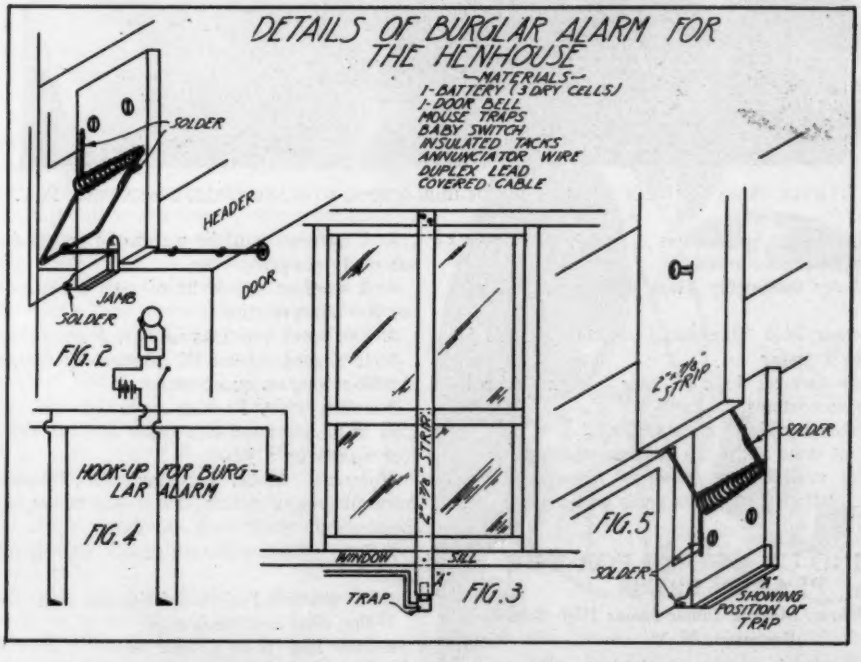
"Now, boys, you have all had your chance at locking up a job, and now we will see which boy can lock up a job correctly, from start to finish, without receiving any assistance. We will start here with Stanley, and the rest of you boys go on with your composition. Stanley, you take Job No. 34 and lock it up for the 10 by 15 Gordon, and I'll go over and work with the other boys. When you have finished, let me know and I'll check up your job."

AN ECONOMICAL BURGLAR-ALARM SYSTEM

W. I. Tawes, Claymont, Delaware

The alarm system described in this article is of the open-circuit type and designed primarily for poultry-house purposes. The installation of the system makes a splendid elementary problem in electricity, as applied to the farm.

A large bell may be installed in the poultry house to frighten the thief away. A better way, however, is to use a common doorbell and install it in a convenient place where it can be easily heard by the owner. A baby knife switch should



be installed in a convenient place to open the circuit in the daytime while the doors are open. Otherwise the bell will ring during the day when a door is opened and run down the batteries. The wire for the dwelling can be either bell annunciator

wire (No. 18 gauge) or drop cord, depending on the finish desired. The line connecting the poultry house with the dwelling should be buried in the ground, so that it will not be tampered with. The best method is to use lead-covered cable consisting of two No. 14 insulated wires. This cable is very flexible and can be bought from any electrical supply house. It is essential that all moisture be excluded from the underground wires.

As can be seen from Figures 2 and 5, common mouse traps are used for switches to close the circuit. All frictional contacts of the trap should be soldered. Most traps when new are copper plated and can be readily soldered, but after they have been exposed to the weather they rust, and used as switches make poor contacts. When the door is open (Fig. 2) the trap closes and makes contact which, in turn, sets off the bell. A zinc or tinned copper plate should be fastened upon the trap where the spring member hits and the annunciator wire soldered to the plate. Shutting the door breaks contact. If continuous ringing is desired, there is a type of bell on the market that will continue to ring after once started until it is stopped by hand. Several methods can be worked out to make a continuous alarm. A relay could be used for this purpose. All joints should be soldered and taped. It is advisable to solder a washer to the end of the rod which strikes the door.

In burglarproofing a window, a narrow strip of strong material is nailed in the middle of the window running up and down, as shown in Figure 3. This strip is fastened securely at the top but loosely at the bottom, so that the least pressure on the strip throws the trap. In large windows another strip running at right angles to the vertical strip at a critical point should be fastened, so that the thief cannot get through the window without throwing the trap. The trap switches of both doors and windows are connected to a main line (Fig. 4). Any number of windows or doors may be installed with protective switches. However, the entire line should not be over 150 ft. in length. For greater distances, a relay arrangement is desirable — that is, the switches should operate a relay and the relay the bells. The reason for this arrangement when operating over long distances is obvious. All wiring in the poultry house should be bell annunciator wire and should be invisible so far as is possible, especially near the traps. A thief might be suspicious and feel around before trying to break into the house.

DECORATIVE DESIGNS FOR EASTER CARDS

D. Elizabeth Roberts, Philadelphia, Pennsylvania

Handmade greeting cards are as attractive for Easter as for Christmas. Cards of this kind are easily made from art paper, and envelopes to match may be made by using an envelope of suitable size as a pattern.

Either tinted or white paper is suitable for such a card, transparent water colors being used on white paper and opaque on tinted papers. A narrow border of gold or color is attractive, and may be made by placing a piece of cardboard on the card, leaving a narrow edge, and then running the brush along this edge, doing one side at a time.

To make cards of this kind, trace the design on a piece of paper of the required size and outline it with india ink. The heavy blacks should be put in with ink and the lettering either in ink or color. Then tint the parts of the design with water color.

For Figure 1, tint the flowers a pale yellow with deeper centers or leave them the tone of the paper. The leaves should be done in two tones of green.

The lily in Figure 2 should be left white with slight touches of gray for shadows and touches of yellow in the center. Two tones of green should be used for the leaves.

In Figure 3 the center portion of the daffodil should be yellow and the center, orange. The flowers and leaves at the sides may be done with india ink, with a background of color around the stenciled leaves and flowers, or they may be done in color with the background left the color of the paper.

The bird in Figure 4 should be tinted brown with orange or reddish breast, and the twig a brownish gray.

For Figure 5, a tint of orange or yellow is pretty at the horizon of the landscape, with blue sky around the clouds. The path should be tinted a buff color, the house red or brown, and two tones of green for the trees and grass. The narcissi should be left the color of the paper with slight touches of gray and the leaves several tones of green.

FIG. 1

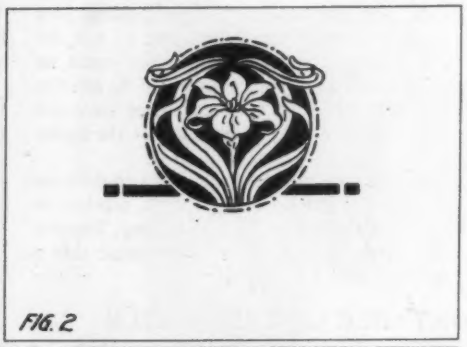


FIG. 2

FIG. 3

FIG. 4

Figure 6 should be colored in a manner similar to that used for Figure 5. Bright touches of color for the flowers in the foreground make this card particularly attractive.

The wording on these two landscape cards could be used for the other designs, or the words "Easter Greetings," "Easter Joy," etc., would be sufficient.

These decorative designs could also be adapted to small

Easter novelties, as penwipers, memorandum books, blotters, etc.; and if enlarged, the circular designs would be suitable for book ends, inside of bowls, and for many other useful articles.

Figure 7 may be used either for a card or for a folder. If for the latter, a greeting could be lettered on the inside page, or the page may be left blank for the written greeting of the sender. Heavy art paper, either white or tinted, is the best material for a folder, as it may be bent without breaking. Any good color scheme may be used for the window, to suit the individual taste. A good scheme for white paper would be shades of green, buff, and rose. The flowers could be left the color of the paper with perhaps a few touches of gray and with yellow centers. A narrow edge of gold makes the folder more attractive.

FIG. 5

FIG. 6

FIG. 7

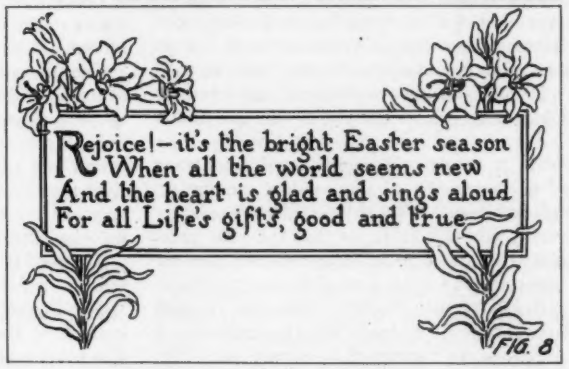

Rejoice!—it's the bright Easter season
When all the world seems new
And the heart is glad and sings aloud
For all Life's gifts, good and true
FIG. 8

Figure 8 is a good one for the person who likes to do hand lettering. If a tinted paper is used for this card, touches of white on the lilies make them more natural looking. Touches of gold and a gold border around the lettering make this a dainty and attractive card.

A PORTABLE UTILITY TABLE

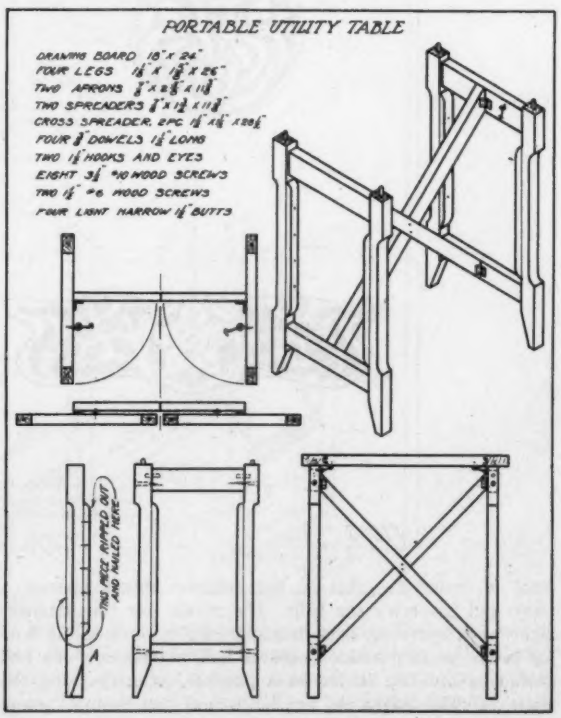
Harvey E. Parry, Boys' Vocational School, Bloomfield, N. J.

A small typewriter table was wanted at camp. There were some scrap pieces of material, and a small drawing board. With a little ingenuity the demountable table described herewith was built, from these odds and ends, at a very small cost.

The 18 by 24-in. drawing board was resurfaced on the best side. All of the edges were dressed off. The four legs were ripped out of a piece of 1⅛ by 8 by 27-in. white pine. They were finished to 1⅛ by 1⅝ by 26 in. Since they lacked all semblance of attractiveness, a piece was cut out of the edge of each one, and the waste piece nailed and glued to the opposite edge of the leg from which it was cut (see A in Fig. 1). To do away with the bulkiness of the bottoms of the legs, they were tapered as shown. The upper and lower spreaders were made of pieces of white pine, ⅞ by 2⅝ by 11¾ in. and ⅞ by 1¾ by 11⅜ in., respectively.

To make demountability as nearly complete as possible, the legs are assembled in pairs, with one 3½-in. screw and a dowel in the upper member and but one screw in the bottom. The cross spreader is made of two pieces, ½ by 1½ by 28½ in. These are hinged at the top and bottom rails so that the legs can be folded against the cross. The joint in the center is halved and held by two screws. The top end of each leg has a ⅜-in. pointed dowel extending ½ in. These fit into holes in the table top. Hooks and eyes hold the underframe fast to the top.

With a little care in withdrawing the screws, the outfit may be demounted and packed into a trunk. The typewriter should be fastened to the table top.

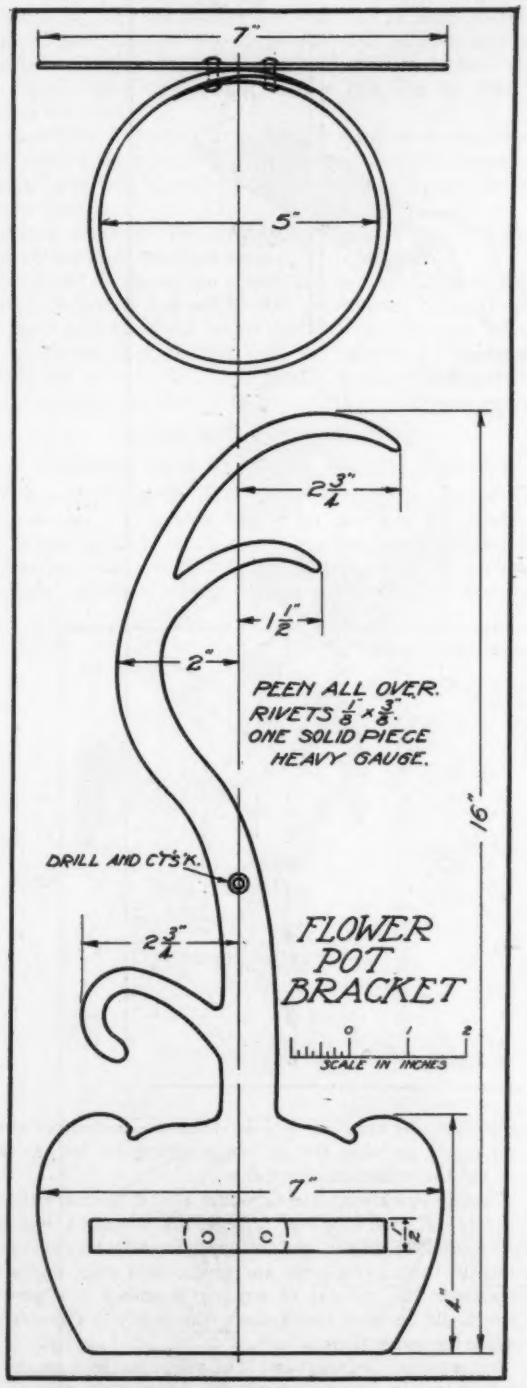

PORTABLE UTILITY TABLE
DRAWING BOARD 18" X 24"
FOUR LEGS 1⅛" X 1⅝" X 26"
TWO APRONS ⅞" X 2⅝" X 11¾"
TWO SPREADERS ⅞" X 1¾" X 11⅜"
CROSS SPREADER, 2 PC. ½" X 1½" X 28½"
FOUR ⅜" DOWELS 1½" LONG
TWO 1½" HOOKS AND EYES
EIGHT 3½" #10 WOOD SCREWS
TWO 1½" #6 WOOD SCREWS
FOUR LIGHT NARROW 1½" BUTTS
A
THIS EDGE PLANED OFF
LEG MARKED LIKE THIS

FLOWERPOT BRACKET

Edward Amos, High School, Bucyrus, Ohio

The flowerpot bracket described herewith is a practical and useful project for the general metal shop. The design is cut from a solid piece of heavy-gauge metal.

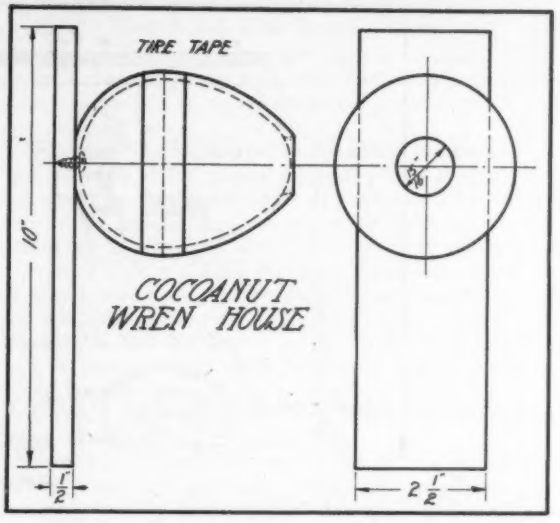
Make a template on a piece of pasteboard. Trace the outline on heavy-gauge metal and cut out with a hack saw. Touch up with a file. Ball peen both pieces all over. Shape holder over a cone to required size, making it just large enough to support the rim of the flowerpot. Attach circle to bracket with two rivets. Finish with two coats of clear shellac or lacquer to keep from rusting, or rub down with linseed oil.



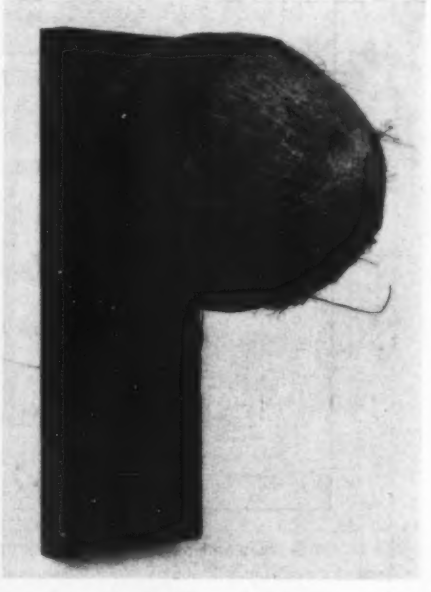
A COCOANUT WREN HOUSE

Clyde R. Garl, McKinley High School, Canton, Ohio

A wren house made out of a cocoanut makes a very practical and neat-appearing bird house, and wrens are quickly attracted to it because of its naturalness.



The making of this bird house is very simple. The cocoanut is first cut through the center with a saw. After that the meat is removed, and then a hole the size of a quarter is cut into the end which contains the eyes. This end of the shell is softer.



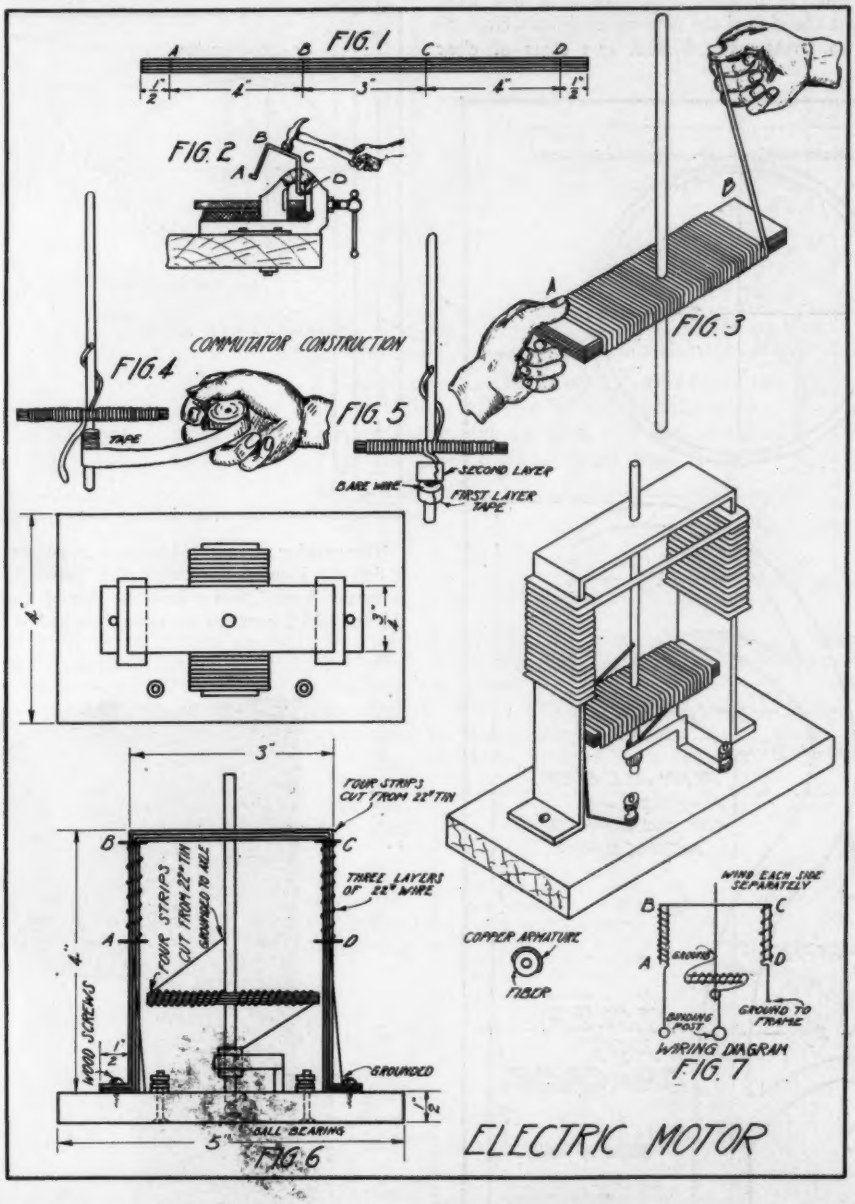
A 3/16-in. hole is then cut into the other end in order that the shell may be fastened to a board or a tree by means of a screw. The two halves are then glued together and the joint bound with tire tape. Two coats of shellac are applied to make the shell waterproof and also to preserve its natural appearance.

The ideal placing for a wren house is under the eave of a building or on the low branches of a tree.

ELECTRIC MOTOR

Carl v. Lindeman, Western State Teachers College, Paw Paw, Michigan

An electric motor is an ideal project for teaching the boy something about the fundamentals of electricity. The one here illustrated has been designed especially for boys of junior-high-school age. It is very simple in construction and may be made of small pieces of waste tin and other materials that may be found in the small school shops. It may be operated from one dry cell. Only 1 out of 25 of these motors built in the author's shop failed to work.



The Base. The 5 by 4-in. base of the motor is made of a piece of oak. The ends may be chamfered if desired. Bore holes for binding posts and shaft, the latter hole being located in the center of the base.

Field Framework. The framework for the field may next be made of 4 or 6 strips of No. 22 gauge tin, size ¾ by 12 in. If desired, this frame may be made of 3/16-in. strap iron. Lay out the frame for forming according to the dimensions shown in Figure 1. To do the bending, use a bench vise, as shown in Figure 2. Drill the holes at the ends, and the center hole for the shaft.

Construction of Armature. The armature is made of four strips of No. 22 gauge tin, size ¾ by 2¼ in. It is best to spot the ends of the strips with solder to hold the strips together.

Armature Shaft. The shaft is made of ⅛-in. galvanized wire, 5½ in. long. Both ends should be rounded. A hole is next drilled through the armature to fit the shaft and the shaft soldered to the armature 1½ in. from the bottom of shaft. Care should be taken that no sharp corners are left, as they may cut the insulation of the wire.

Winding Armature. The armature is next wound with No. 18 or 22 c.c. wire. It is best to begin this winding at one end, and to continue with it until the opposite end is reached. Then return to the starting point and repeat until three layers are completed. The method of winding is shown in Figure 3. Care should be taken that enough wire is left at the ends for making the connections.

Commutator Construction. The commutator is made by winding two layers of tape on the lower part of shaft, as

shown in Figure 4. The insulation is stripped off one end of the armature winding wire and this end is then wrapped halfway around the shaft. Another strip of tape is then wound over this wire to hold it on shaft, as shown in Figure 5. Care should be taken that enough wire is left exposed for the brush to make contact. The other end of the armature winding is grounded on the shaft by soldering it to the latter. This is shown in Figure 4.

Field Winding. The field is wound with three layers of No. 18 or 22 c.c. wire. Leaving 4 in. of wire, begin at A, Figure 6, and wind up to B, then from B back to A and from A back to B. From B the wire is carried over to C, where the same operation is performed, except that the winding is carried down to D, then back to C, and again to D, again leaving 4 in. of wire to make the connection. The winding may be covered with tape if desired, giving it a finished effect and holding the windings together. Shellac may also be used if tape is not desired.

Assembling Parts. The parts are now ready to be assembled and this is done by following the drawings. It should be noted that a ⅛-in. ball is used at the bottom of the shaft to decrease friction.

Wiring Diagram. The wiring diagram in Figure 7 shows how connections should be made.

CAUTION: If the motor should fail to work, reverse connection A and B and results will be obtained. Care should be taken that the brush makes contact only when the armature is 90 deg. from the field coil. The material for the brush should not be too stiff. Main-bearing shims of automobiles make very good brushes.

PNEUMATIC TRAY

G. B. Westerberg, Junior High School, Red Lion, Pennsylvania

This project was the result of a call from the science department for a pneumatic tray of standard size and quality.

The job demands accuracy and neatness, and provides experience in laying out, transferring a pattern to metal, cutting, breaking, punching, wiring, and soldering. The top edge of the tray is wired with a No. 12 wire. All joints are soldered in order to make the job water-tight.

This project makes a very good production job and because of the variety of jobs which it contains, it may be used to give the students a pretty fair idea of how production work is carried on. This is particularly valuable with continuation-school students who are just getting their first contacts with factory methods.

A POSTURE CHAIR FOR THE KITCHEN

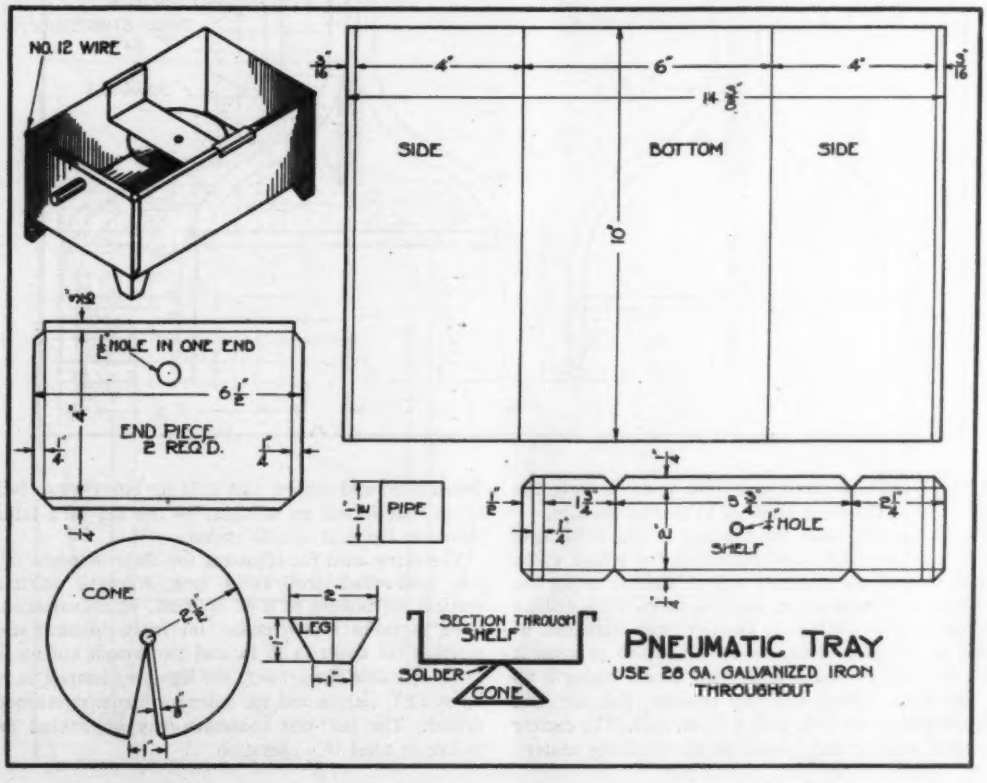
Claus S. Asp, River Rouge, Michigan

The satisfying of human needs and the enriching of the student's shop experience have long been recognized as the prime requisites to be considered in the introduction of new shop projects.

The posture chair presented in this article was designed to meet the need of the modern housewife for a kitchen chair that would be more comfortable and convenient than those used by her grandmother. Its adjustable height and appropriately placed foot rest and back support, all designed to conform to modern posture principles, are features which enable the housewife to perform such kitchen tasks as ironing and dishwashing, while sitting, thus relieving her of the fatigue caused by being continuously on her feet. Moreover, this chair is practical for use in commercial classes, such as typing, etc. Librarians also will appreciate its comfort. For these varied uses the seat and back may be upholstered or padded as desired.

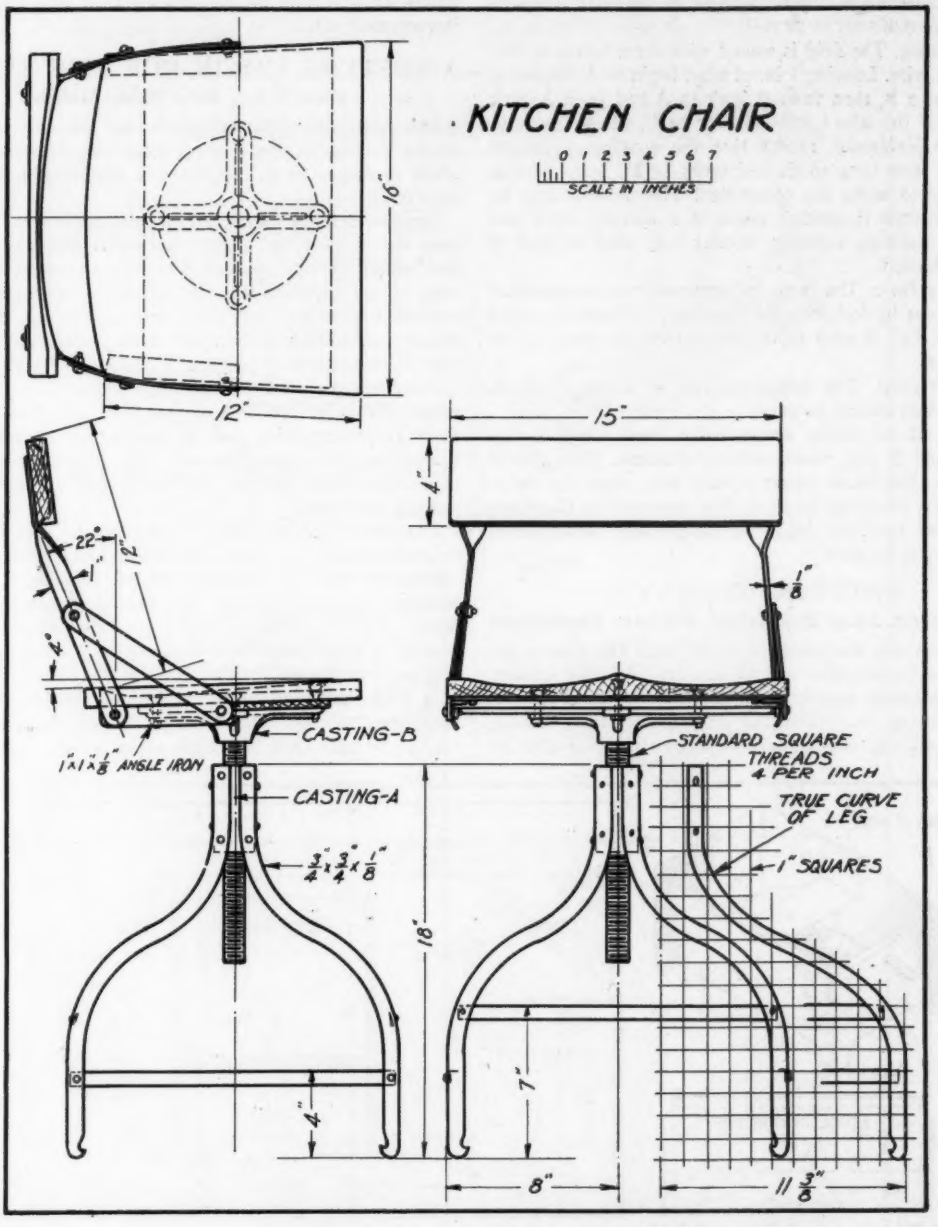
Enriched shop experience is provided by this stimulating project through the many and varied processes involved, including the making of simple patterns, molding of aluminum castings, cutting of external and internal square threads, laying out, bending, drilling, riveting, etc. The project lends itself readily to either individual or quantity production methods.

Angle iron is used for the legs, the lower ends being heated in a forge, soldering furnace, or similar heating device, and hammered to the desired shape. They are then ground smooth so that they will slide easily on the floor. Rubber



tips or roller casters may be used, but they will add materially to the cost of the project.

In order to make the long curves of the legs uniform and correct, a full-sized drawing may be put on the blackboard and used as a template. It is preferable to do the bending cold, in a vise. The iron braces, or foot rests, holding the legs together, are of the same material as that of the legs.



Aluminum is used to make the castings A and B because that metal is light in weight, and because many school shops are equipped so that the students will be able to make the castings. Extreme care, however, must be taken when drilling and threading the two castings to assure proper alignment of the separate parts of the chair. As an aid in this process, it is advisable to place casting A in a 4-jaw chuck, truing it up carefully, and then drilling half way through, full size, and then finish the rest of the hole with a 5/8-in. drill. The casting is next reversed, end for end, placed on the two lathe centers, and the jaws of the chuck tightened. The live center is then removed and the inside square threads cut.

Casting B is then fastened to the edge of a small plank which, in turn, is fastened in the drill vise at the angle desired for the seat of the chair to tilt backward. The hole is then drilled and tapped with a 7/8-in. tap, the tap being guided so that it will go straight, by the aid of a lathe center placed in the drill spindle socket.

The screw used for adjusting the chair to height is made of 1-in. cold-rolled steel, 11 in. long, a length which allows a vertical adjustment of 6 in. or more, which variation is sufficient to make it convenient for most ordinary uses. This screw is cut down to 7/8 in. and the threads cut on the lathe.

To assemble the project, the legs are clamped to casting A by small C clamps and the holes for 3/16-in. rivets marked and drilled. The foot-rest crossbars may be riveted on, either before or after this operation.

The seat is made saddle-shaped, by hand. A second thin board is fastened crosswise under the main board to prevent it from splitting or breaking. One of the angles of the angle iron, used in holding the back in place, is fastened between these two boards.

Casting C is fastened to the seat with ¼-in. flat-head stove bolts; round-head bolts of the same diameter are used to fasten the flat side braces of the back. Finally, the chair is lacquered or enameled in the color scheme best suited to its use.

This kind of construction will produce a chair that is light in weight, strong and durable, pleasing in appearance, and yet not too expensive.

STRING BOX

R. A. Werner, Ruffner Junior High School, Norfolk, Virginia

The string box is not only useful and handy in every kitchen, but also makes a very fine coping-saw project. It may be made of any kind of soft wood.

The box may be stained and varnished, or enameled in any color to match the kitchen color scheme.

The pieces are assembled either with ¾-in. No. 5 r.h. screws, or with 1-in. brads.

A CONCRETE SIGN

Charles E. Thomas, State Teachers College, Hattiesburg, Mississippi

Figure 1 will give you an idea of what the manual-arts department at Mississippi State Teachers College, Hattiesburg, is contributing toward the general beautification of the college campus. The following is an account, in detail, of the construction of the terraced sign which faces an arterial highway on the front of the campus:

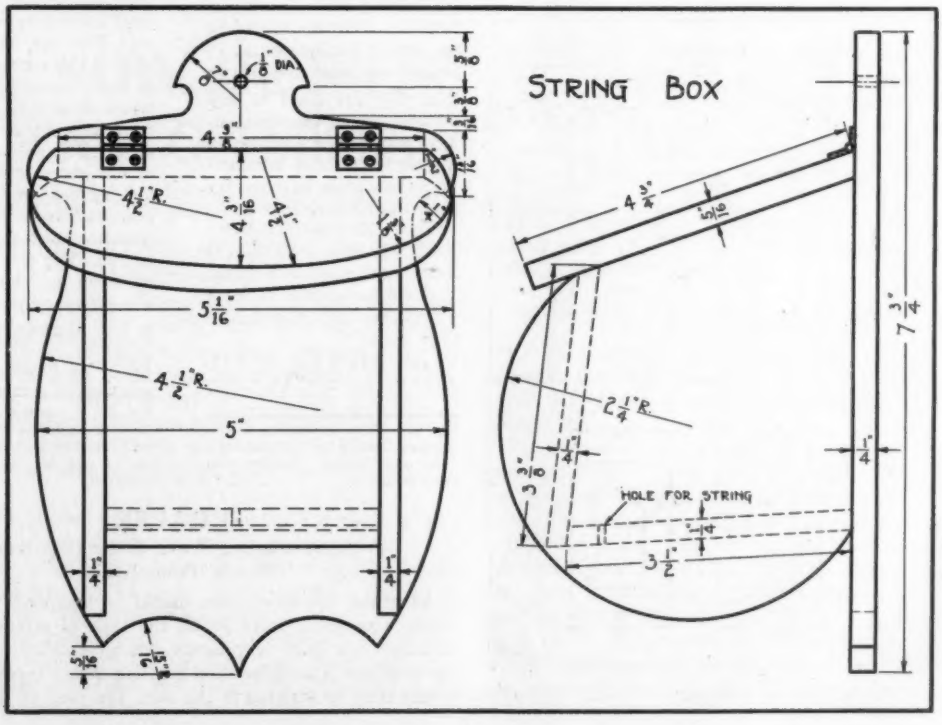
To make sure that the letters were well shaped and of a correct size before making the forms for concrete, they were first cut from beaver board. They were then taken to the location and placed on temporary strips which had been previously fastened to stakes supporting them parallel to both the street and the ground, the front one elevated 12 inches and the rear strip just enough higher to set the letters at an angle of about 25 deg. The entire sign is 70 ft. in length.

After the letters were arranged in the words and all spacing done as would appear about correct, some of the members of the class got into an automobile and drove at different speeds, back and forth in front of the sign on the highway, stopping now and then to make minor adjustments and notations of changes needed — one important observation being that both A's and T's appeared narrow. These were replaced by letters that were one and two inches wider, respectively. This change offered a more pleasing job, and the temporary letters were then taken to the shop where forms were constructed for the permanent concrete letters.

Forms for Letters: One by three-inch soft sap, select, yellow-pine lumber proved most satisfactory for forms. They were nailed together with two 6d casing nails to each joint. They were constructed according to the dimensions shown in Figure 2.

Reinforcing: After the forms were placed on a paper-covered space of the concrete shop floor, ¼-in. reinforcing rods were bent and arranged in all of the letters. To insure strength, double rods were required in all letters, but in some parts of certain letters triple rods were used.

Concrete: A wet mixture of 1½ parts of *very* coarse sand, to 1 part of plain Portland cement (not white) was used.



HOW THE CONCRETE SIGN APPEARS FROM THE HIGHWAY

Every part of each of the forms was thoroughly filled with this mixture and the top rodded off true. The letters were left in the forms for curing for a period of 30 days. Water was freely sprinkled over them every day while they remained in the forms. This work was purposely all done indoors, to allow slow drying and proper curing.

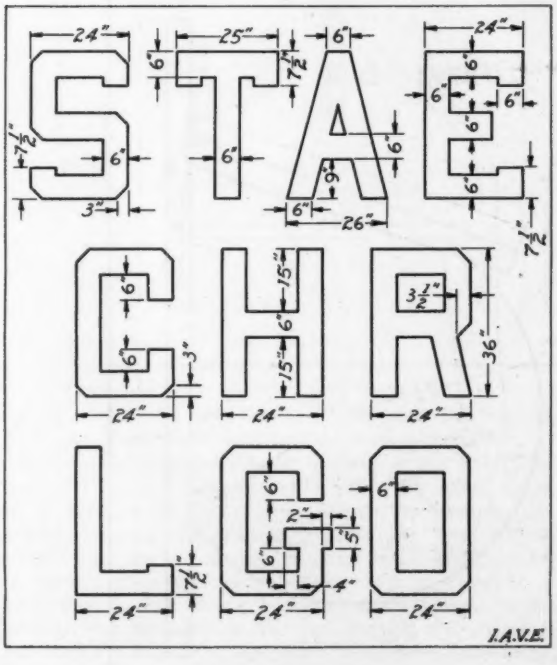
Terrace: For at least two months the building of the terrace was under way, each rain helping to settle the dirt which was filled in and around the temporary strips or bearings for letters. These strips served as a depth gauge for the terrace dirt, and since the strips were of nonrot wood they were allowed to remain in the terrace permanently, thereby assuring uniformity regardless of further settling of the soil.

Placing the Letters: After the letters were carefully taken from their forms and hauled to the location of the sign, they were put in place on the terrace, yet allowed to rest a bit on the original strips or bearings to insure trueness. The tops were all adjusted to a line and the spacing was done so as to appear most pleasing to the eye.

Sodding: The final job was the sodding of the terrace in all open spaces between the letters and words. For this, bermuda sod, approximately the same thickness of the letters, was used. The sod was tamped so as to make the whole sign, including the letters, perfectly smooth. To promote the growth of grass, the terrace was kept well watered.

Now the bermuda is rooted and as it grows up it is clipped, by hand, at regular intervals, back to the level of the letters in the sign.

The appearance of the sign is quite pleasing, and the question "What institution is that?" has been definitely eliminated.



DETAIL OF LETTERS

ACKNOWLEDGMENT AND CORRECTION

Mr. Ken F. Shepardson wishes to give credit to Mr. C. W. Frost, of Arcata, California, for the design and construction of several of the arrow-making contrivances described in his article which appears on page 104 of the March issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. Among the devices to be specially credited to Mr. Frost are the arrow sanding book, nocking jig, and the butt-hinge feather-shaping jig. Unfortunately, this information arrived after the MAGAZINE was already in print.

—◎—

The illustrations, Figure 1 and Figure 2, shown in "Elements of Job Composition," by Frank P. Rich in the last issue of this MAGAZINE, should appear as shown herewith.

MEYER ALL-WOOL
SUMMER CLOTHES
Are Worn by
ÉLITE OF CHICAGO
They are popular in all of the great fashion centers in America. They are offered to the men of this country at
Prices as low or Lower
than they are asked to pay in most stores for commonplace and inferior goods. You will see the force of our arguments as soon as you try these clothes on. The
GOOD WORKMANSHIP AND CHOICE PATTERNS
must surely appeal to you. You will know what we mean by "clothes that fit and keep their shape."
R. R. MEYER & CO.
127 State St., Chicago

Fig. 1. Where everything is emphasized there is no real emphasis. This advertisement contains too much display.

MEYER ALL-WOOL
SUMMER CLOTHES

Are worn by élite of Chicago

They are popular in all of the great fashion centers in America. They are offered to the men of this country at prices as low or lower than they are asked to pay in most stores for commonplace and inferior goods. You will see the force of our arguments as soon as you try these clothes on. The good workmanship and choice patterns must surely appeal to you. You will know what we mean by "clothes that fit and keep their shape."

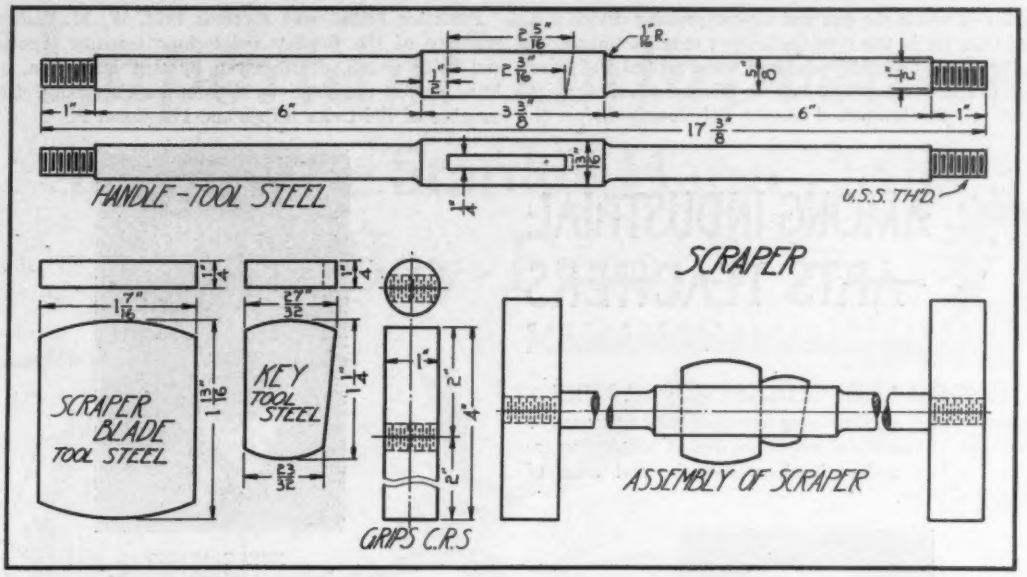
R. R. MEYER & CO.
127 State St., Chicago

Fig. 2. A resetting of the advertisement shown in Fig. 1. It is much easier to read and more pleasing to look at. It is not overdisplayed.

SCRAPER

F. N. Newton, Jr., Sharon Senior High School, Sharon, Pennsylvania

All school machine shops should be equipped with a few handy scrapers. I have found the type of scraper herewith described not only very handy but an excellent project for the students in machine-shop practice. Many types of scraper blades may be inserted in the slot. The uses of this tool are



limited only to the type of blade which is inserted for each type of job. It is up to the workman to judge the shape of the blade he needs for any given job. This scraper has been found very handy in scraping all kinds of bearings, guides, etc.

Ordinarily it takes a different type of scraper for each type of job, but with this tool it is only necessary to have the blades which are made to fit the slot, and it is only a simple operation to change from one blade to another, thereby making a combination tool suffice for a lot of single tools.

This scraper will furnish the drawing room, forge shop, and machine shop with a practical project.

Making the Scraper

Have a tool-steel forging hammered out about an inch longer than the finished length of the handle and with about ¼ in. of stock on the outside. The slot for the scraper blade should be swaged out by driving a tapered key or swage into the middle of the handle until the desired size is obtained.

The piece should then be cut off to the length required and centered on both ends. Place it on centers in the lathe and turn it down to the desired sizes. Then cut threads on each end as shown in the drawing. This thread should be a tight fit when screwed into the threads in the grips. A good plan would be to use the grips as a gauge when cutting threads.

The grips may be made of cold-rolled steel. The scraper blade should be forged out of tool steel very nearly to size and then ground at the scraper end and stoned to a good edge.

The key should be made of a good quality of steel and forged nearly to size.

In assembling, the slot for the scraper and the key should be filed out smooth, and the grips screwed on good and tight. The scraper and key should be filed to fit snugly.

NOW, ARE THERE ANY QUESTIONS ?

PROTECTING AUTO AGAINST FLORIDA MOISTURE

957. Q.: I should like to have advice concerning the proper surface treatment to give a 1928 model Star car to preserve the original finish, which is still excellent, during a winter of considerable exposure in the moist salt atmosphere of Florida. I believe that the original finish is Duco. I have been advised differently by different individuals, some believing that Simonizing would be sufficient, while others suggested clear lacquer or spar varnish. What brand of finish do you recommend?—*G. H. L.*

A.: If the original finish on the Star 1928 model is sound, then Simonizing is an excellent way in which to keep it so. On the other hand, if the cleaner has started to cut through the color lacquer enamel coats to the surfacer and metal primer then the only recourse is to clean the body for paint-shop work and spray on one or two double coats of lacquer. After drying hard overnight the final coat should be water-sanded, sprayed with a mist coat to level out all sanding marks and then buffed or hand-polished. In no case is a coat of clear lacquer or spar varnish of any value under Florida conditions, and it is seldom of any value elsewhere because of their rapid deterioration. The auto lacquers of the better-known companies, Pratt & Lambert, Egyptian, DuPont, Murphy, are all good. It is mostly a case of local supply and experience in application. I will say, though, that the DuPont Service Shops appear to be better serviced and better informed as to improved trade practice, assuming that the owner is a square dealer.—*Ralph G. Waring.*

PAINT SPRAYERS

960. Q.: Are the paint sprayers operated by being connected to the spark-plug opening of an automobile and having adjustable nozzles satisfactory for spraying lacquer upon an automobile?

Can you give me the name of a company from which I might purchase a lacquer container and adjustable nozzle to use in connection with an air compressor?—*G. H. L.*

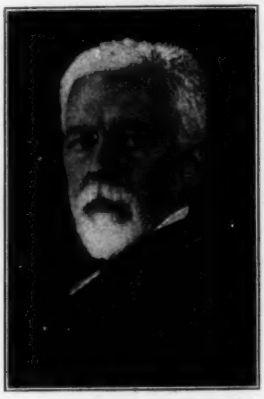
A.: The spark-plug-connection type of sprayers are not only useless, but if used with lacquers may be the source of considerable oil spotting due to admixture with oil and raw gasoline from the nonfiring cylinder. Lacquer for an auto body must be handled at not more than a 50-per-cent reduction, at about 45 lb. pressure by a gun capable of adequately atomizing the paint. Such an outfit is the DeVilbiss Co. ½-h.p. outfit and their CH gun. There are no worth-while prac-

tical outfits in which the gun and air-compressing device is a complete unit, for in this type the lacquer must be thinned to such an extent that the film produced when applied and dried is too thin to be worth while. It is on this one practical point that most of the low-priced outfits fall down.—*Ralph G. Waring.*

AMONG INDUSTRIAL-ARTS TEACHERS

DR. GEORG KERSCHENSTEINER DIES

On January 15, 1932, Dr. Georg Kerschensteiner, Germany's great exponent of vocational education, died at Munich, where he worked so long and so hard to show the real value of his pedagogical ideas.



DR. GEORG KERSCHENSTEINER

He was born in Munich on July 29, 1854. At the age of 11 he was ready to enter a teacher-training institution at Freising, Bavaria, and five years later he accepted his first position as teacher. After a few years of teaching experience, he determined to again attend school and entered a preparatory school at Augsburg to get himself ready for the University of Munich.

At the end of his University training, he was employed at the Meteorological Bureau of Munich, but he soon gave up this position to return to teaching, his favorite subjects being mathematics, natural history, and the sciences.

In 1895 he was appointed to a position in Munich, similar to that of superintendent of schools in our country. He at once began to reconstruct the entire educational system, and it was in this position that he had the opportunity of working out his ideas relative to vocational education, which have since been copied and adapted the world over. At the end of the world war, he resigned his position in order to become professor of pedagogy at the University of Munich.

Although death has put an end to his labors, what he accomplished will continue to live and spread through the institutions that he erected and the pedagogical literature which he left us.

PROFESSOR FRIESE GOES TO PENN STATE COLLEGE

Prof. John F. Friese, formerly in the department of industrial education of the University of Wisconsin, has accepted the position of associate professor of industrial education at the Pennsylvania State College, State College, Pa.

Professor Friese, who succeeds Prof. W. M. Walter, is a graduate of the Bradley Polytechnic Institute, Peoria, Ill., and holds a B.S. degree given by that institution, and an M.S. degree presented by Wisconsin University. He is a member of Phi Delta Kappa and Phi Sigma Pi.

JOHN F. FRIESE
Department Industrial Education,
Pennsylvania State College,
State College, Pa.

He has had considerable trade experience in carpentry and drafting and enjoys a wide acquaintance with teaching and supervisory work through his experience in the day and evening classes at St. Cloud, Minn., and his work at the University of Wisconsin. While at the latter institution, he was in charge of the industrial-arts and vocational teacher-training classes. He also conducted correspondence courses and directed the research of graduate students.

Professor Friese, who is well known in the industrial educational field, is the author of several books and is a frequent contributor to the professional literature on industrial arts and vocational subjects.

ASSOCIATION AND CONVENTION NEWS

THE WESTERN ARTS ASSOCIATION AT ST. LOUIS

The committee in charge of the arrangements for the meeting of the Western Arts Association has announced that progress is being made in the completion of the program for the meeting to be held May 3–7, at St. Louis, Mo. The committee has provided a list of speakers who are well known in their respective fields and who are capable exponents of their several points of view relative to social and educational functioning of the arts.

Dr. Eugen Gustav Steinhof, of Vienna, is a famous designer of stage sets, an artist, sculptor, and educator; Dr. Homer J. Smith, of the University of Minnesota, is head of the department of industrial education; Florence Fallgatter, of Washington, is the federal agent for home economics in the central region and a specialist in the field of the arts related to the home; Dr. Herbert Spinden, of New York City, is an archeologist and lecturer of note and an authority on American arts and crafts; Mr. Louis LaBeaume is a member of the board of the American Institute of Architects; and Mr. John L. Bracken is well known as a progressive in education.

The meeting will take up such subjects as the following:

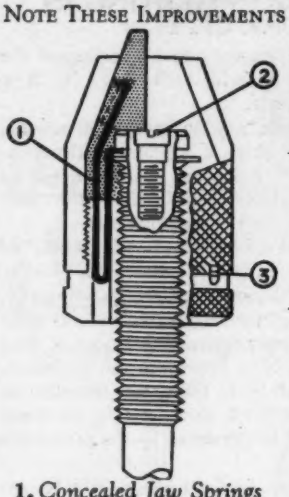
(Continued on Page 14a)

6 Important Improvements

make these Stanley Hand Drills

"Boy-Proof"

NOTE THESE IMPROVEMENTS



1. *Concealed Jaw Springs* hook into the hardened steel jaws and are protected from the bits and drills — a decided improvement over the exposed coil type spring. (See No. 1 above.)
2. *Chuck is locked on Spindle* by concealed shouldered screw. (See No. 2 above.) Chuck opens only to capacity and stops. It will not run off the spindle.

No. 616
3½" Speed Gear
Takes drills up to ¼"

No. 626
4" Speed Gear
Takes drills up to ⅜"

No. 617
3¼" Wide Flange
Solid Speed Gear
Takes drills up to ¼"

NOTE
THESE IMPROVEMENTS

3. *Chuck is sealed together* by staking the metal of the base of the chuck into a notch in the shell. (See No. 3 in detail illustration.)
4. *Steel Frame* — the one-piece steel shaft combines light weight and unusual strength.
5. *Machine cut gear and pinion teeth* and an idler pinion which balances the speed gear, insures smooth, easy operation.
6. *Heavy offset crank and long handle* provide ample clearance for the fingers holding the frame handle and give a better and more comfortable grip.

These new Stanley Hand Drills fulfill the requirements of shop instructors for "Boy-Proof" Hand Drills. They are simple in design, comfortable to use, and their improved and protected construction insures them against breakage.

Complete description of Nos. 616, 626 and 617 will be sent upon request.

THE STANLEY RULE & LEVEL PLANT
Educational Department
New Britain, Conn.

STANLEY TOOLS

Stanley Equipment is Standard Equipment

USE STARRETT HACKSAWS

Three
New...

Starrett
Rules....

No. 305—Decimal equivalents on one side; quick reading 32nds and 64ths on the other —90c.

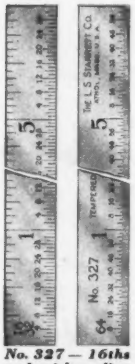
Trust Starrett for new developments in steel rules!

There's No. 303, a time-saving, step-saving combination, with quick-reading 32nd and 64th graduations on one side — *and on the other a complete table of decimal equivalents, ready for instant reference.*

No. 327, a flexible, spring steel pocket rule, incorporates another time and motion saving idea. It has regular 16th, and quick-reading 32nd and 64th graduations — *all starting from one end. There's no need to turn it end-for-end, or read it upside-down.*

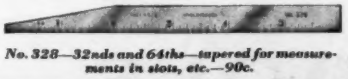
Finally, note the taper of No. 328. It's made for easy measurements in holes and slots.

Ask your supply house or your favorite hardware dealer to show you these rules or write for the Starrett New Tool Folder CE.



No. 327 — 16ths and quick-reading 32nds and 64ths —all from one end —flexible— 90c.

THE L. S. STARRETT CO.
World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes—Standard for Accuracy
Athol, Mass., U. S. A.



No. 328—32nds and 64ths—tapered for measurements in slots, etc.—90c.

Use Starrett Tools

5538

(Continued from Page 142)

The Place of Fine and Industrial Arts in the Field of Education; Color as a Means of Self-Expression; What is Art Appreciation?; Stimulating the Pupil in Artistic Production; The Teaching of Art Related to the Home; Great Cities of Ancient America; and Vocational Guidance of Youth.

MICHIGAN INDUSTRIAL-EDUCATION SOCIETY TO MEET

The annual meeting of the Michigan Society for Manual Arts and Industrial Education will be held on April 14, 15, and 16, at Flint, Mich. Dr. C. A. Prosser, director of Dunwoodie Institute, Minneapolis, Minn., will be one of the principal speakers at this meeting.

THE EASTERN ARTS MEETING IN NEW YORK CITY

Preparation of the program for the annual meeting of the Eastern Arts Association, to be held April 19–22, in New York City, is practically complete.

Dr. E. A. Colligan, associate superintendent of schools, New York City, will give the address of welcome at the opening session, Tuesday, April 19. Following this, there will be an illustrated address on "Theater Arts," by Prof. Roy Mitchell, College of Fine Arts, New York University.

On Wednesday morning, Prof. Sallie B. Tannahill, of Teachers College, New York, Mr. G. A. Hatch, of Boston, and Miss Mary Buckley, of Paterson, New Jersey, will speak. There will be a noon luncheon meeting, with a round table for the discussion of professional problems, in charge of Miss Margaret Mathias, Montclair, New Jersey. In the afternoon, there will be an address by Mr. H. L. Gage, vice-president of B. Altman & Company, New York, and a report on home furnishings and decoration will be presented by the president's conference committee.

At the Thursday session on April 21, there will be addresses by Mr. Royal Bailey Farnum, Providence, Rhode Island, Mr. R. L. Leonard, Pratt Institute, Mr. Donald Shappel, Rochester, New York, Mr. David Barr, Mr. Maris Proffitt, Washington, D. C., Prof. C. R. Richards, New York Museum of Science and Industry, Mrs. Sidonia M. Greenberg, of the Child Study Association of America, Miss Annie D. Scott, Haverhill, Massachusetts, Miss Annie B. Wertsner, Ambler, Pennsylvania, and Miss Mabel Penney, Paterson, New Jersey.

One of the speakers for the Friday general session will be Mr. Ernest E. Calkins, of Calkins & Holden Advertising, New York. The final session on Friday will be held in connection with the annual banquet and ball.

It is planned to hold a sectional meeting on industrial arts in the New York Museum of Science and Industry. The program for the meeting is to be supplemented by a visit to the Museum by the visiting teachers and supervisors.

FEBRUARY MEETING OF BOSTON VOCATIONAL SOCIETY

The regular February meeting of the Vocational Education Society of Boston was held February 13, at the Hotel Westminster, Boston.

The principal speaker at the meeting was Mr. Gifford K. Simonds, general manager of the Simonds Saw and Steel Company, who took for his subject a description of his ultra-modern factory which has attracted national attention. This factory, which is windowless, in the opinion of Mr. Simonds, has proved effective in promoting efficiency among the workers. He found that the factory is kept much cleaner, dust is eliminated, the heating problem is simplified, and the use of artificial light has improved the lighting conditions. Noise in the factory has been reduced 72 per cent due to the fact that

(Continued on Page 18A)

Regal Lathes are made in five sizes, 10″ to 18″. The Super Regal is made in two sizes, 12″ and 14″. Prices range from $276.00 to $947.00 F.O.B. factory. Each lathe comes equipped with motor, ready to run. Also large face plate, small driving plate, steady rest, graduated compound rest, tool post, collar and wedge, taper spindle sleeve, lag screws and washers, foundation plan, instruction book, centers, and necessary wrenches.

PROTECTION *wins*
the preference when building
THE SUPER REGAL

SAFETY FIRST is the predominating idea of the LeBlond engineers when building this ideal school lathe. Its latest improvements make it easily a winner by comparison. Safety features and simple control

—induce greater initiative on the part of the student.

—increase the confidence of the student in his natural ability.

—lower the instruction resistance because it is typical of the lathes the student desires to operate after graduation.

Its unusual accuracy pleases the student and meets with the approval of the instructor.

It's a super-controlled lathe with improved 8-speed geared head, helical gears, reversing and compounding feed gears inside of headstock, one-piece apron with first stud and rack pinion on ball bearings, one shot lubrication, single trip lever to operate the carriage and cross slide, feed rod to maintain the accuracy of the lead-screw.

The Super Regal simplifies the work of the instructor and the student, resulting in greater progress with less effort than ever before. Let us tell you the complete story.

The most up-to-date book on the operation of geared head engine lathes. Its 70 pages, 10 big chapters, are filled with information, illustrations, diagrams, etc., useful to the instructor and helpful to the student operator. Sells for 25 cents. Sent free to any instructor when requested on the school letterhead.

Ask for descriptive literature on the Super Regal.

SEE OUR DATA IN BRUCE'S SCHOOL SHOP ANNUAL 1932 EDITION

THE R. K. LEBLOND MACHINE TOOL CO.

CINCINNATI, OHIO

MORE PROJECTS PER and *better* ones,

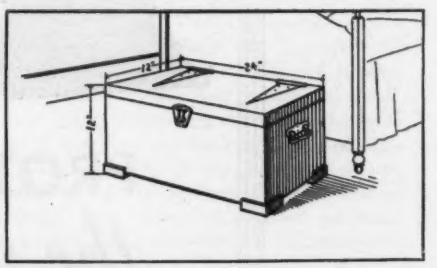
Douglas Fir Plywood offers you all the structural advantages of laminated wood at less cost per surface foot than ordinary lumber.

THE cabinetmaker's favorite lumber — plywood — can now be *your* regular stock-room supply — not only without added cost, but with *actual savings* per project!

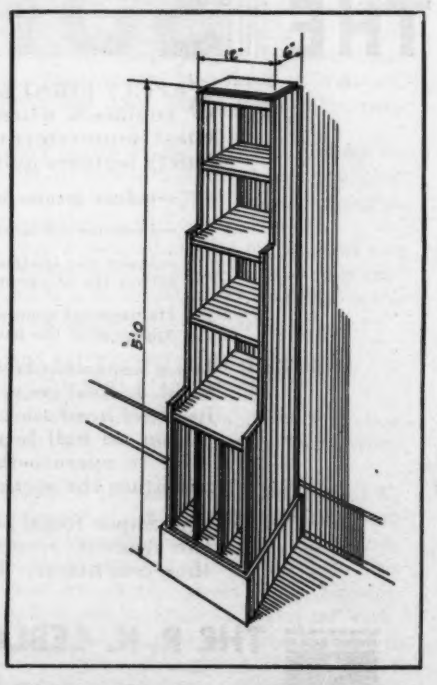
Douglas Fir Plywood, the most inexpensive of all plywoods, is thinner and stronger than ordinary lumber — gives you more projects per board-foot — and works with less waste. It saws easily in any direction, can be planed, sanded, and finished like ordinary lumber, holds nails close to the edge without splitting, and is stronger per pound than steel.

Douglas Fir Plywood is the ideal material for magazine racks, table tops, desks, cabinets, toys, boxes, mirror backs, modern furniture, doors, panels, drawers, shelves and similar jobs where wide, true-working boards are needed.

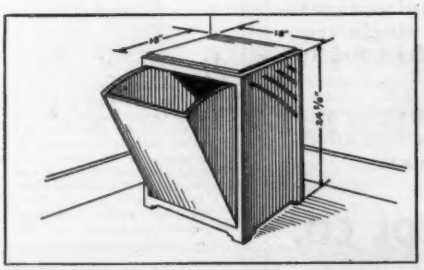
Ask your local lumber dealer for quotations on various sizes and thicknesses. A free sample, and working plans of interesting Plywood projects, will be sent you free, upon request. Mail coupon today.



CHEST: *One of the most popular of all projects—simplified and made inexpensive by Douglas Fir Plywood, which gives it hardwood strength combined with light weight, and makes it dust-proof.*



PIER CASE: *This popular project compresses a lot of convenience into very little space, and Douglas Fir Plywood makes it easy to build, as well as warp-proof, crack-proof, and light in weights.*

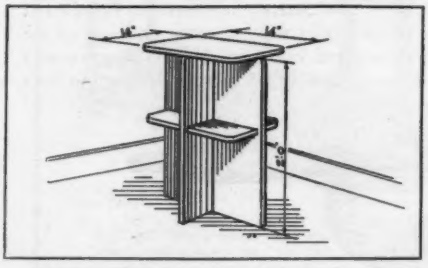


CLOTHES HAMPER: *Every mother will welcome this smart-looking step-saver. Made of Douglas Fir Plywood, it becomes an easy project, one that will stand years of service without cracking or warping.*

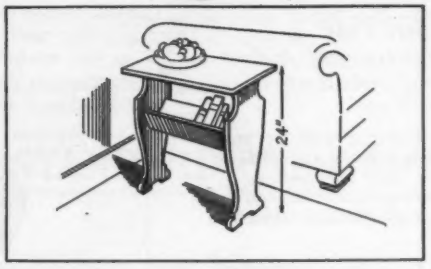
SMOKING STAND: *Dad will be proud of this. Douglas Fir Plywood makes it inexpensive, easy to build, light-weight, split-proof.*

DOLLAR too!

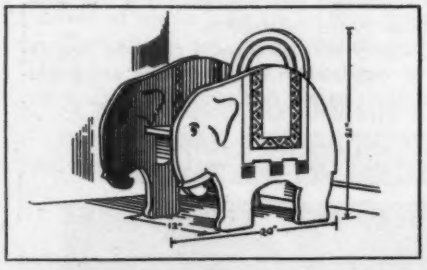
Big panels of laminated lumber in sizes up to 4 feet wide and 8 feet long, and in various thicknesses, such as 1/4", 3/8", 1/2", 3/4"—to suit the needs of any job.



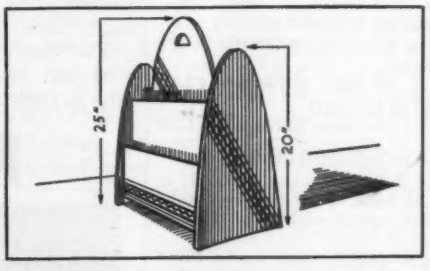
MODERN STAND: *An elementary project—yet a smart and modern decorative element for the living room, or for Mother's or Sister's room. Made of Douglas Fir Plywood, it will never warp or split.*



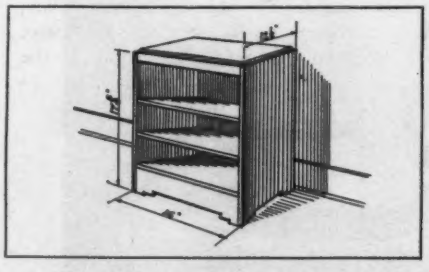
END TABLE: *Always a welcome addition to a living room—smart and useful. Douglas Fir Plywood helps your students build it faster, and makes it stronger. Also it takes any finish.*



CHILD'S CHAIR: *Students will have a lot of fun building this novel yet useful project—and note how Fir Plywood's wide, thin panels save time and eliminate excess weight.*



MAGAZINE RACK: *Any youngster will be proud to take home this attractively designed convenience. Douglas Fir Plywood speeds up the work, reduces the weight, and is proof against splitting or warping.*



MAGAZINE STAND: *Every mother can make good use of this commodious magazine rack—and here's one that students can build easily and inexpensively, with Douglas Fir Plywood.*

$5000.00 for IDEAS!

THIS is not a contest, but an outright purchase offer for practical project-designs featuring Douglas Fir Plywood. Entries must be postmarked not later than August 15, 1932. Here's what we want:

1 A sketch, or plan, with approximate dimensions, for just as many Douglas Fir Plywood uses as you care to submit. We will buy as many of your ideas as we can use.

2 You need not make finished or elaborate drawings. Clear "idea sketches" are enough—just so they indicate dimensions and show how your design is to be constructed.

3 You are not limited in the variety of uses you may suggest. For example, you may design Douglas Fir Plywood walls and objects for a whole room—such as a boy's study, a recreation room, a child's playroom, etc.—or you may design Douglas Fir Plywood fixtures and built-ins, such as wardrobes, breakfast nooks, bookcases, radio cabinets, store displays, filing compartments, office conveniences, etc.

4 For every usable sketch employing Douglas Fir Plywood, we will pay you $25.00 cash, otherwise returning your sketches if return-postage accompanies them. If, in addition to your sketch, or plan, you care to send us a photograph of your design as built, we will pay you $5.00 *extra*, or a total of $30.00 for each accepted "idea sketch." Each sketch purchased becomes the property of Douglas Fir Plywood Manufacturers with right to use it for advertising, publicity, or in any other way.

DOUGLAS FIR PLYWOOD

REAL LUMBER
Engineered for greater size and strength

DOUGLAS FIR PLYWOOD MFRS.,
Dept. 432-F, Sixth Floor, Skinner Building,
Seattle, Wash.

Gentlemen: Please send me your new project plans, and a free sample of Douglas Fir Plywood.

*Name*_____

*Address*_____

*City*_____ *State*_____

*School or Institution*_____

VOCATIONS IN INDUSTRY

with

Manual and Occupational Studies

by May Rogers Lane

Instructor in Vocational Guidance and Analysis of Occupations, Oswego State Normal and Training School.

These books represent several years of work by May Rogers Lane, a national authority on Occupational Studies. The material has been used and perfected in vocational-guidance teacher-training classes conducted by the New York State Department of Education under her personal supervision.

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Prepared especially for teachers of Occupations Classes. It is authoritative and the most complete book of its kind ever published. The MANUAL is extremely useful with VOCATIONS IN INDUSTRY or independently.
111 pp., 6x9, 14 charts, 44 inserts, cloth bound $2.00

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Presenting two important reports:
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☐ Occupational Studies

I agree to return texts if not adopted or to remit for same.

NAME_____

POSITION_____

SCHOOL_____

ADDRESS_____

(Continued from Page 14A)

the absence of windows has eliminated echoes. Following the talk, Mr. Simonds discussed the application of the idea to school buildings.—*Louis A. Van Ham.*

INDIANA INDUSTRIAL-ARTS TEACHERS MEET

The industrial-arts teachers of Indiana will hold their annual spring meeting April 15 and 16, at Kokomo. There will be an exhibit of books and supplies and materials for teachers.

SCHOOL SHOP EQUIPMENT NEWS

FOR THE SUPERVISOR OR TEACHER WHO DESIRES TO KEEP ABREAST WITH THE NEWS OF NEW MACHINERY, TOOLS, SUPPLIES, ETC.

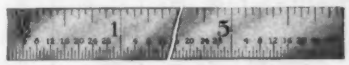
ANNOUNCE NEW STARRETT MICROMETER

The L. S. Starrett Company, Athol, Mass., has announced the marketing of a new micrometer, with carboloy-faced anvil and spindle. This new Starrett micrometer, faced as it is with a material which resists wear, is more practical to use on jobs where abrasive conditions exist. Its use also prevents inaccuracies due to wear, and it has a much longer life than the ordinary micrometer.

THE NEW MICROMETER

The carboloy-faced micrometer is equipped with lock-nut and ratchet stop, and the frame is designed for use in inaccessible places. It can be had with a range of 0 to 1 in. reading by thousandths or by ten-thousandths.

The Starrett Company has also issued a new 6-in. flexible-steel rule, made of high-quality, tempered steel, and graduated in 16ths and 32nds on one side and 64ths on the other.



6-IN. FLEXIBLE RULE

All graduations read from the same end so that the rule need not be turned end for end or the figures read upside down. It is furnished with a metal-bound pocket case to which is attached a convenient pocket clip.

NEW STEEL SUPERCLAMP

The Cincinnati Tool Company, Norwood, Cincinnati, Ohio, has announced the marketing of its No. 44 steel superclamp. This clamp has approximately the same weight as the

THE STEEL SUPERCLAMP

standard carriage clamp, but it has twice the resistance to both tensile and transverse strains.

(Continued on Page 21a)

ADVERTISING PAGES REMOVED

Today It Must Be Steel!

Pat'd and Pat's Pending

Fig. 484 — "HALLOWELL" Bench-Leg of Steel, for steel and wood tops. Exceptionally rigid. 30 sizes.

Pat'd and Pat's Pending

Fig. 924—"HALLOWELL" Work-Bench of Steel, with laminated plank in front; angle tie bars below. Carried in stock.

Pat'd and Pat's Pending

Fig. 928 — "HALLOWELL" Work-Bench of Steel, with a laminated all-wood top. Open below. Facilitates sweeping.

Pat'd and Pat's Pending

Fig. 732 — General view of the "HALLOWELL" Work-Bench of Steel, with back board, end pieces, etc. Carried in stock.

We have crowded the space with pictures to show different types of "HALLOWELL" Shop Equipment of steel, suitable for Vocational Education.

The legend below each cut is self explanatory, but to fully appreciate our "HALLOWELL" Line get our

BULLETIN 433

STANDARD PRESSED STEEL CO.

BRANCHES BOSTON CHICAGO DETROIT

JENKINTOWN, PENNA.

BRANCHES NEW YORK SAN FRANCISCO ST. LOUIS

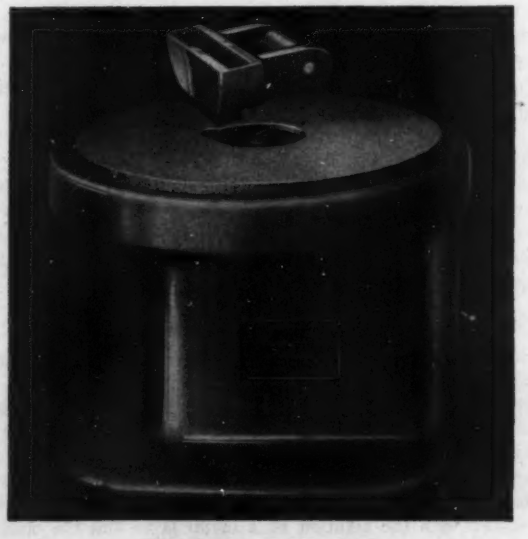
(Continued from Page 18a)

The screw is made of hardened steel and is of large diameter, with a powerful acme thread. Swivel lever handle instead of regular wing can be furnished without extra cost.

These clamps can be furnished in sizes from 3 in. up to 16 in.

A NEW PIKE POWER BENCH STONE

The Pike Manufacturing Co., Pike, New Hampshire, has just marketed a new power bench stone which is quite revolutionary. This device, known as the No. 50 bench stone, does not replace the tool grinder, but it is designed to give a finished edge to all kinds of tools, especially those with broad. flat cutting edges like chisels, plane irons, box and bearing scrapers, molding knives, and machinists' scrapers.



PIKE POWER BENCH STONE

The method of supplying oil to these stones is very novel and satisfactory. The stones can be changed in the twinkling of an eye without the use of wrench, nut, bolt, or any other complicated locking device. The standard equipment of the No. 50 consists of one medium India oilstone, a Universal motor, gravity oil feed, and an 8-ft. extension cord.

ISSUE NEW CATALOG OF WOODWORKING EQUIPMENT

The American Saw Mill Machinery Company, of Hackettstown, N. J., has just issued its new Catalog No. 31-M, describing and illustrating its Monarch line of woodworking machinery for school shops. The catalog lists manual-training lathes, jointers, surfacers, band saws, bench saws, tilting-arbor saw benches, tilting table saws, universal saw benches, chisel mortisers, drum-and-disk sanders, spindle shapers, tooi sharpeners, and a list of miscellaneous shop supplies.

A copy of the catalog will be sent to any school-shop instructor who asks for it.

CHANDLER & PRICE WALL CHARTS

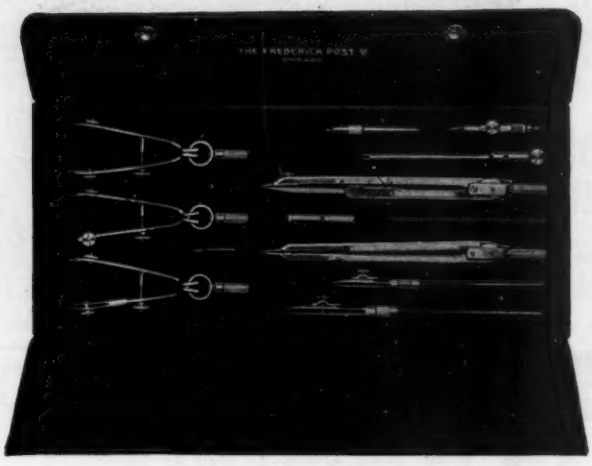
The Chandler & Price Company, 6000 Carnegie Avenue, Cleveland, Ohio, has recently issued some attractive and useful wall charts and lesson sheets on the platen press and lever cutter for use in school printing classes. The charts which illustrate the press and cutter indicate the important parts by captions and arrows. Each is mounted on heavy cardboard 20¼ by 21 in. in size. They are supplied with brass eyelets

(Continued on Page 22a)

"JUNIOR SETS" FILL RIGID SPECIFICATIONS

. . . . and moderate budgets

Each instrument is guaranteed against defective workmanship and material.



This set is equipped with repair vial.

No. 1130

THE FREDERICK POST CO.
P. O. Box 803
CHICAGO

List $5.50

THE FREDERICK POST CO.
P. O. Box 803
CHICAGO

Less substantial discount to schools

(Continued from Page 21a)

and cords permitting them to be hung on the classroom walls.

The lesson sheets are printed on bond stock 8½ by 11 in. in size, and correspond with the charts in every way except that all captions are omitted. The students are required to write in the names of the various parts from memory, thus testing their knowledge of trade terms in connection with these two pieces of apparatus.

These charts and lesson sheets are supplied to printshop instructors without cost.

IAVE NEWS — NOTES

Manual Training Retained at Racine, Wis.

The school board at Racine, Wisconsin, has refused to eliminate manual training and other subjects from the high-school courses. The board had obtained the attitude of the parents before taking action on a suggestion that some courses be dropped as an economy measure.

A Study of Scholarship Aptitude in Wisconsin

A special state committee has recently presented a report on scholarship aptitude of 34,000 high-school seniors in Wisconsin institutions. The study was made to obtain certain facts upon which to base an educational-guidance program and the tests sought to develop a more accurate and informative system of scholarship ratings to determine the student's qualifications to continue successfully his educational work in the college or university.

The students were tested on arithmetical reasoning, grammatical analogies, number completions, vocabularies, and reading comprehension. The report indicated a wide difference in scholastic abilities and revealed that something more than a certificate is required to predict success in a higher educational institution.

Directors of Industrial Education Convene

State Supt. James N. Rule, of Pennsylvania, has announced that the annual spring conference of city directors of industrial education will be held March 15 and 16, at Harrisburg. This conference, which is of considerable importance due to the problems arising as a result of the economic situation, will deal largely with administrative problems in the field of industrial education. One full day will be devoted to industrial-arts education, and another day to vocational education.

Among the topics to be taken up at the conference are the following: Activities in an industrial-arts program; How to promote safety in the shops; Time allotments for industrial arts; Development of a better grade of projects and a wide range of projects; Photography as a unit of instruction in the junior high school; Use of activity combinations; and Requirements for industrial-arts teachers.

New Quarters for Electrical Department

The board of education of Owensboro, Ky., has obtained new and enlarged quarters for the electrical department of the trade school. The building has been equipped with double-deck booths for demonstration purposes in the teaching of electrical wiring and electric lighting. The shop is equipped with a heavy workbench, containing four stations for testing batteries and motors. The auto-mechanics shop has been improved with the addition of a metal lathe and the opening of new rooms for teaching the academic work. A total of 80 boys are enrolled in the two trades.